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NEW YORK REVIEW OF THE

TELEGRAPH AND TELEPHONE

AN ELECTRICAL JOURNAL.

AMES.

Vol. 1, No. 4. NEW YORK, APRIL 1, 1882. [$2.00 Per Annum. Single Copies, 10 Cents.

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Live it Down.

Do people slander your good name
About the church or mart or town,
And carry lies on wings of fame?
Just live it down.

Do you aye humbly live discreet,
While villains bask in high renown,
Who pace the earth with shining feet?
Why live them down.

Are you within the world's race,
Yet wandering poor 'neath fortune's frown?
Put on a smiling cheerful face
And live it down.

Do you toil flagging up the hill,
While others o'er your head have flown?
Your heart godlike with courage fill
And live all down.

When yelping curs with mouthing rage
The voice of reason in you drown,
In patience work till doubts assuage,
And live them down.

Do people think your heart is weak
Because your outward bearing's meek?
'Cause inward strength you ever seek,
Why, live it down.

Be you in world's hell-like mart
Fighting a noble Christian part,
Yet sinning creature seeming art,
Why, live it down.

You'll reach the highest heights you could
On earth, and yet wear heaven's crown,
If but with godlike heart you should
Live all things down.

—*Omicron.*

Telephone Extension.

INTEREST IN THE NEW EXPERIMENTS—PREPARING FOR LONG-DISTANCE TELEPHONING IN THE EAST.

Notwithstanding that telephone managers firmly believe nothing can come of the experiments of the Oswego and Suspension Bridge parties, who are seeking to use the telephone over regular telegraph wires, the interest in them is considerable. Telephone lines are constantly being extended by stringing new lines of wire, and if it *should* be found that the regular telegraph wires may be used in the extension, it would go far toward revolutionizing the telephone business.

It is well known that Buffalo is now connected with many of the suburban towns by telephone. It would seem, however, that the extension of telephone communication here has not yet gone nearly as far as it has in the Eastern States. What was called the Inter-State Telephone Company was organized in Providence, R. I., last year with $100,000 capital. It strung seven wires between Providence and Boston and secured franchises permitting it to run wires from Providence to New York, Worcester, Springfield, &c. It had in Connecticut altogether 278 miles of wire. Meantime it was found that the company was in competition with the Connecticut Telephone Company, and a consolidation of interests, if not directly of the two companies themselves, has just been effected. Stock of the Inter-State Company to the amount of $75,000, or three-fourths of the entire amount, was transferred to the Connecticut Company, $65,000 being taken by New-Haven stockholders and $10,000 by ex-Governor Marshall Jewell.

The Inter-State Company was then reorganized by the election of Governor Jewell as President of a new Board of Directors. The two organizations will now work together for their mutual advantage. New lines of wire are to be strung—probably as much as 300 miles—during the present year. Telephone exchanges will be put in at the larger towns between New Haven and New London, and it is believed long-distance telephoning will become an important feature of the business. Connection between New Haven, Providence, Boston, Springfield, and Worcester is expected. The Inter-State Company is to run trunk lines so as to connect with the Connecticut Company's line in every town. The two companies intend to furnish every town in Connecticut and Rhode Island and every school district of two hundred inhabitants with telephone service before the close of 1882.

How rapidly these extensions would be made, all over the country, if the regular lines of telegraph wire could be utilized every one will readily understand.—*Buffalo Express.*

Riding on Edison's Electric Railway at the rate of 20 Miles an Hour.

Several miles of Mr. Edison's electric railway at Menlo Park are now completed, and a few days ago the pupils of Professor A E. Sloan's school, of Bergen Point, N. J., about thirty in number, were carried over this road by electricity at the rate of over twenty miles per hour. At the experiments in Berlin last year, on nine miles of the Siemens road, the speed attained was only about ten miles per hour. Mr. Edison's track is like that of any ordinary railroad, involving curves, grades (one over thirty feet to the mile), with the various obstacles of ravines, streams and rocks. The car resembles our modern horse-car. The electricity is communicated from the generators, some 300 yards away, by two heavy wires, one connecting with each track. The tracks are insulated by covering the ends of the ties with a non-conducting compound. The wheels take up the electricity from the tracks and communicate with the dynamo-electric machine and gearing in the locomotive. Thus is given to the train a noiseless rapid, pleasant motion, unattended with smoke, cinders and clatter.

Electrical Exhibition at Crystal Palace.

This interesting exhibition at the Crystal Palace may now be said to be complete, and everybody may enjoy the magnificent effect of the beautiful light, streaming down upon the many artistic objects contained in the vast building. On the occasion of the visit of the Duke and Duchess of Edinburgh there was a trial, and the full light was only displayed on Wednesday in last week, when the perfection of the show was attained. The illumination by the Lane-Fox lights (only four of them), of the fairy-like Alhambra Court, is charming; the Oriental and glittering architecture appears to the greatest possible advantage. The lamps are opalized, and therefore they can be looked at without danger of dazzling or hurting the eyes. The outline of the court seemed "picked out" with light, and the effect was most delightful, as was also that produced in the Pompeian Court, where the fluted columns and classical statuary appeared as if bathed in the purest southern moonlight. In the picture gallery the Swan lights, which recently proved so unsuccessful in Norwich, but which, however, have given great satisfaction at the Surrey Theatre, are used, and this time with perfect success, proving the subdivision of the light to be easily practicable. The pictures do not lose at all by being illuminated by these burners, and the colors are in no way altered; on the contrary, they look neither better nor worse than they would on a very sunny day.

There can be no question that electricity is to be the lighting medium of the near future, and it is most satisfactory to note that the display at Sydenham shows that, although only now in its infancy, it is already rapidly advancing to perfection. Of course, at present, it is difficult to foresee what the ultimate results will be, but every day now brings the solution of the problem nearer, and the time will doubtless soon arrive when we shall wonder how even our immediate forefathers—indeed, ourselves—could have endured such poor light, and such dirty, tarnished abodes as we do now. Certainly, if ever the electric light becomes as widely diffused as is gas, the benefits will be truly wonderful, both in comfort and, above all, in cleanliness.

Mr. Edison has won for himself a great name in the scientific world, and to him, naturally, fall the honors of the show at Sydenham. His exhibit in the concert room is striking. Suspended from the gallery, in festoons, hang his improved incandescent lamps, and his name in brilliant light is inscribed over the orchestra. From the ceiling hangs a chandelier illuminated with sparkling "Edison lights." The galleries are also lighted by him in a superlative manner, some of the lights assuming the appearance of petals of flowers, being encased in various colored glasses, producing a fairy-like effect. The Swan-light chandelier, of brass work, is greatly admired. The light has been here "steadied" in a marked degree. All along the nave are exhibited a series of

competing arc lights, which look like so many full moons, and which render the place so brilliant that from the galleries above it is quite easy to distinguish even the features of friends below; that is, if one is possessed of an ordinary strong sight. The great beauty of electric light is that there is no haze about it, and therefore all objects stand out in clear and even vivid relief. This is noticed by the spectators at the "Savoy Theater." They can see the faces of the actors in "Patience" without the use of opera glasses. By the way, the thermometer in this theater only falls about four degrees after the large audience has left at the end of the performance. In the old times, under the gas regime, it usually sank 15 and 20 degrees.

The scene presented in the Crystal Palace, when the whole place is lighted up with the various electric lights and burners from the end of the nave, is magical. The luxuriant vegetation, the slender palm trees, the innumerable creepers, and the broad-leafed banana plants stand out in vivid contrast to the snow white statues and the fountains, which seem as if wrought in pure snow. The glass roof above also is greatly embellished, for it really looks like a vault of silver filigree. The Duke and Duchess of Edinburgh were so delighted with this fairy-like scene that they stood admiring it for nearly half an hour.

The Chinese Court, always gorgeous, with its bright colors and lanterns, is doubly so now, as seen by the Crompton light, which is, perhaps, the brightest of all. At the end of the western corridor the Faure accumulator is exhibited, and the machinery producing the majority of the lights is in operation. Here, also, is Mr. Kelway's electric log, and that gentleman's agent willingly explains to visitors the method of application of this invention to nautical purposes.

Edison has the most attractive court of all entirely to himself, and here exhibits his lights as applied to domestic purposes. In the center of the apartment, which is called "the Entertainment Court," is an immense gilt chandelier of floral design, by Messrs. Veritz & Son. The sunflower figures appear to advantage, being the principal flower introduced. From its leaves radiates the purest white light. The other flowers are mode of colored glass, and present a gay appearance, like a monster nosegay—but of lights. One hundred and twenty variously-tinted blossoms flower on this dazzling tree. In the side of the wall of the chamber is a panel. You open it and turn a little handle. This immediately lights one-third of the "flowers." Turn it twice and two-thirds are illuminated; thrice, and all is in full bloom, or rather blaze. This clever invention is admirably suited for assembly rooms and concert halls. There is to be seen here a clever little machine for lighting cigars. Facing a small porcelain column are a quantity of metal pipe lighters, immersed in an inflammable liquid. On withdrawing one of these, it comes in contact with an electrical current, hidden in the china column, and instantly ignites. When replaced, the light is extinguished, because in its descent it touches a counter current.

On the whole, the exhibition at the Crystal Palace is eminently successful. Beautiful as the palace always is, under any circumstances, it is doubly so now, radiant with brilliance and crowded with a delighted throng each evening, as it has not been for many years past. The truth is the electric light puts a stop to certain objectionable matters, which, in former times, rendered an evening at the Crystal Palace not as satisfactory as it might have been. Now every nook and corner is distinctly, as it were, penetrated by the light, and bold, indeed, must be the individual who would dare misbehave. It is sincerely to be hoped that before very long all the parks and public gardens will be similarly lighted up. Then a stroll of an evening in the park would be possible, and not, as now, disagreeable and even dangerous. It has been very truly said that "light is an admirable preventative of vice and crime." If this be the case, and it unquestionably is so, then ought we to be especially thankful to the electric light, which is so peculiarly penetrating and brilliant. *La lumiere chasse le vice* is the motto selected by a French electric light company. It is not a bad one. Another great advantage is already noticed at the palace. When in former years the place was open of an evening and lighted by gas, it was observed that the plants suffered greatly. Now they do so no longer, no more than they would by moonlight.—*Mail.*

Berlin Elevated Railway.

The City Railroad (elevated) in Berlin, built by the government and opened February 7, has cost about $16,000,000—$2,300,000 per mile. It was projected (but not by the government) some ten years ago, when Berlin was growing with unexampled rapidity, and the crowding of the city and the rents paid for the poorest quarters were absolutely frightful, and when, too, there were practically no horse railroads. Now there are many street railroads, and the high rents caused such a furore of building that there are said to be 15,000 unrented dwellings in the city. The new road, however, is thought to have fair prospects of financial success. By building it the government avoided an expenditure of $2,500,000 for a station for one of its roads, and it will be of very great value as a connection of existing railroads, used for bringing suburban trains from various lines into the heart of the city—something as if the suburban trains of the New Jersey roads entered New York over one of the elevated roads and stopped at all its stations.

The Lighting of the Savoy Theatre.

The general adoption of the electric light for the illumination of theaters and other places where large numbers of persons congregate, cannot be very much longer delayed, because it fulfills every requirement for perfect lighting, and when properly carried out is free from nearly all the dangers and defects which appear to be inseparable from all other systems of illumination.

The lighting of a theater, however, involves the fulfillment of conditions peculiar to itself, and which differ in very essential qualities from all other installations, and it is not too much to say that any system of illumination which is applicable to the lighting of a high-class theater can be successfully applied almost anywhere, for there is no installation which can furnish so severe a test for any given system. Let us see then what are the peculiar requirements to be fulfilled in the lighting of a theater. In the first place the auditoriums of theaters are, for obvious reasons, not provided with windows, and thus they are at once deprived of the principal means of ventilation and circulation of air, both of which other buildings can have the advantage. It is, therefore, highly important that an illuminating agent should be employed which does not in its action overheat the air, and above all which is incapable of vitiating the atmosphere by continually pouring into it the poisonous products of combustion that are inseparable from every system of illumination except that of electricity. Another requirement of theater illumination is the production of a well-distributed, brilliant, and pure light, one which is completely under control, and can be regulated at will from the stage. This requirement is fulfilled with very considerable success by gas, but, on the other hand, gas illumination cannot be compared for steadiness or purity of light with any of the incadescence systems of electric lighting.

Many who have never been behind the scenes at a theater are under the impression that the principal source of illumination for the stage is the row of footlights, and perhaps a few gas jets immediately behind the proscenium, but in order to obtain adequate illumination for the various scenes, the stage of every theater is provided with long rows of gas jets above the heads of the actors and behind almost every layer of scenery, as well as a corresponding number of vertical columns of lights behind the "wings," and no one can stand behind the scenes when anything like a spectacular piece is being performed without being struck with amazement that it is possible to run a piece for many nights together without the theater being burnt to the ground, for the whole surroundings, above, below, and on every side, appear to be made up of naked gas jets and scenery composed of the most flimsy and inflammable materials, the two appearing almost to come into contact at every draught of air. As a matter of fact, however, the lamps are nearly always covered with wire netting, by which the scenery is kept out of the flames, and the comparative rarity of fires at theaters is a proof that managers and their responsible agents are very careful in the handling of so dangerous a combination. It is therefore impossible to overestimate the importance to the lighting of a theater, and especially the stage, of employing a system of illumination which is practically a perfect safeguard against fire. We have referred to the comparative rarity of fires in theaters, but this rarity is unhappily only comparative, and must be considered rare only in connection with the dangerous combination of gas jets and inflammable material, which until lately was necessarily inseparable from the stage of a theater. When, however, a fire does occur during a theatrical performance, it is too often awful in its character, and in the fatality which accompanies it, and the recent disasters at Nice and Vienna have not only roused the public and the authorities in all countries to consider the safety against fire of theaters, and other similar places of amusement, but theatrical managers have all, for more reasons than one, been awakened to the importance of attending to this all-important question.

In the autumn of last year some highly interesting experiments in connection with the Exhibition of Electricity were made at Paris on the electrical illumination of the Grand Opera, and were described in these columns at the time. These experiments excited very considerable public interest, and constituted the first practical indication that the light of the future for theater illumination must be looked for in electricity.

Almost simultaneously with the establishment of the experimental installations at the Paris Opera, Mr. D'Oyley Carte, the enterprising proprietor of the new Savoy Theater, in London, determined to light this charming little theater by the Swan incandescence electric light, and the work of installation was entrusted to Messrs. Siemens Brothers & Co., who appointed one of their electrical staff, Mr. C. Koppler, to carry out the work in their behalf. The theater is lighted by no less than 1158 Swan lights of the improved form introduced by Mr. C. H. Gimingham, of the Swan Electric Light Company, who have adopted it as their most improved pattern. Of these 1158 electric lights the auditorium is lighted by 114 lamps attached in groups of three, supported on very elegant threefold brackets projecting from the different tiers and balconies, each lamp being enclosed within a ground or opaloid shade, by which arrangement a most soft and pleasant light is produced.

* * * * * *

In an artistic and scenic point of view nothing could be more completely successful than the present lighting of the Savoy Theater; the illumination is brilliant without being dazzling, and while being slightly whiter than gas, the accusation of "ghastliness," so often urged against the light of the electric arc, can in no way be applied. In addition to this

the light is absolutely steady, and thanks to the enterprise of Mr. D'Oyley Carte, it is now possible for the first time in the history of the modern theater to sit for a whole evening and enjoy a dramatic performance in a cool and pure atmosphere.—*Engineering—London.*

PHYSICAL SOCIETY, London, February 25.—Prof. W. E. Ayrton, F. R. S., read a paper on Faure's accumulator, giving the results of experiments made by him and Prof. Perry, on the efficiency, storing-power and durability of the battery. The efficiency was got by measuring the power put in, and comparing it with that taken out, by means of Perry and Ayrton's voltameter and ammeter. The authors found that the cell has great resuscitating power if left insulated after all the current appears to have been discharged. Care had to be taken to see that the cell was quite discharged by letting it stand on open circuit for intervals and discharging between whiles When this was done they found that the total loss for charges up to one million foot pounds need not be greater than 18 per cent. With slower charges they got a loss of only 10 per cent. As to the storage, a mean current of 18 amperes gave, after eighteen hours' discharge (six hours on three consecutive days), 1,440,000 foot pounds of work equivalent to 1 horse-power in forty-three minutes. The cell contained 81 lbs. of red lead, thus making a capacity of about 18,000 foot pounds per lb. of red lead. The cell showed no deterioration after two months of work.—Prof. Ayrton then described a new form of his dispersion photometer, which greatly reduces it in size and convenience. The principle of this instrument has already been described to the Society by the author. It consists in using a concave lens to disperse the stronger light, and thus obviate the necessity of putting it at a great distance if it is very powerful, such as an electric light. The powers of the two lights are compared by the eye in estimating the intensity of the shadows of a rod thrown on a white screen of blotting paper by the two lights simultaneously. A sperm candle is used as the standard, and it is placed on a movable stand at an angle to the path of the other beam through the lens. Both the lens and candle can be shifted to and from the screen along a scale giving their distances, and the stronger beam is reflected from a small mirror. This mirror is ingeniously fixed so as to reflect the ray from the same part of its surface whatever angle it is placed at, and thus the power of an electric light can be accurately given for every angle along which the ray travels from the lamp. Observations are taken through red and green glasses to get a better measure of the power of the light. Prof. Ayrton has found that ordinary air absorbs the green rays of the electric light very strongly, and hence, in order to get a proper test of an electric lamp, the photometer should not be far from the light. The new dispersion photometer shown is the only one admitting of this precaution.—Mr. Shoolbred stated that he had found from experiment that the carbons of the Swan and Maxim incandescent lamps bore a much higher current without breaking when fed from a Faure accumulator than from a dynamo-electric machine. Prof. Ayrton corroborated this statement, and said that he had obtained a light of 800 candles from a Maxim lamp fed by an accumulator.—Prof. Sylvanus Thompson then read a paper on the electric resistance of carbon under pressure. It was generally stated that the resistance of carbon diminished under pressure, but he had found from recent experiments that the diminution observed was really due to the contact between the electrodes and the carbon. Under pressure there are more points of contact between the metal and carbon than without pressure The result has an important bearing on the action of the carbon relay, rheostat, and microphone transmitter.—Prof. Ayrton pointed out that as carbon apparently diminished in resistance under a rise of temperature, this would seem to indicate it as a compound substance, since only simple substances seemed to increase in resistance with rise of temperature. Prof. Guthrie recalled that Dr. Moser had suggested that the alteration of the resistance of selenium under light was an effect of contact.—A paper by Mr. G. Gore was read, on the influence of the form of conductors on electric conductive resistance. His experiments were designed to show whether there was a difference of resistance in certain liquid conductors under the positive and negative current. None was discovered —Dr. Hopkinson, F. R. S., read a paper on the refractive index and specific inductive capacity of transparent insulating media. He inferred from tried experiments and the electro-magnetic theory that glass had a high refractive index for rays of very long wave-length.—Dr. J. H. Gladstone suggested that the point should be tested by experiment, and that the method of photographing the red rays might be employed.—Mr. J. Macfarlane Gray explained that an objection to one result of his former communication to the Society, on the specific heat of steam, was really a confirmation of it, as Regnault's value was erroneous.—*Nature.*

Paris Exhibition of "Aerial Arts."

There is to be an international exhibition of "Aerial Arts" held in Paris next year in memory of the invention of balloons, which was made by the two Montgolfiers in the year 1783. We understand that these arts are to include every industry, science or art relating to gas, electricity or the atmosphere, which is supposed to have any connection with aerostratic experiments.

On Phosphor Bronze for Telegraphic and Telephonic Transmissions.

In the last number of *l'Electricien* appeared a notice on the employment of wires of phosphor bronze for overhead telephonic transmission We feel it our duty to return to this subject, as the question appears to us to be one of very great interest, and besides we have to add a few remarks to what has been already said, and also a few corrections. In a conference held on this subject at the International Congress, we said that we hoped to succeed, with the help of improved processes of manufacture, in imparting to phospor bronze wire a conductibility greater than that till now possessed by it, at the same time preserving its maximum of resistance to fracture. Our opinions were well-founded. The wire, covered with a layer of oxide, which we call magnetic, gave in fact the following comparative results:

Our representative for France, M. Vivarez, formerly a student at the Ecole Polytechnique and at the Ecole des Mines, has quite recently tested, at the laboratory of the Societe Generale d'Electricite the wires prepared in this manner. A wire, one millimeter in diameter and 100 meters in length, gives a resistance of 6 ohms. We see, therefore, that these phosphor bronze wires have an electric conductibility equal to $\frac{1}{3}$ that of copper, and 2.6 times as great as that of iron.

This wire is therefore far superior to that tried by MM. Nystrom and Rothen, concerning which we wrote in the last number. The phosphor bronze wires have an electric conductibility equal to about $\frac{1}{8}$ that of copper and 1.5 times as great as that of iron. (*L'Electricien*, 15th Dec.)

Although the conductibility is thus considerably increased, the liability to break does not vary. This is a consideration of the highest importance. This great tenacity allows, as we know, of a considerable reduction in the number of supports, and we can, besides, make them much lighter.

When we require to suspend over one roof as many as 400 or 500 wires, it stands to reason that the question of supports is one of importance. With the certain extension of telephonic lines and the increased number of wires resulting therefrom, if we had recourse to iron or steel, the effect produced would be far from artistic, and certainly objections would be raised against towns being darkened more than they are at present. From this point of view, a great service has been rendered by avoiding, as far as possible, fractures, which are highly probable with a collection of wires of large diameter, and which could not but be dangerous.

It has unhappily been shown in England sometime ago, that the breaking of iron wires of large diameter can cause death. Such dangers are much less to be feared with wires of phosphor bronze, which, even if they happened to break, would act as a spring, coiling up to the posts.

In cold countries snow soon collects on wires of moderate thickness. Wires of No. 8 gauge, such as are used in Scotland, Sweden, Austria, Hungary, &c., present little surface for snow, and as their tenacity and conductibility are quite sufficient, there is no need to use thicker wires, which would be more expensive and would become, like steel and iron wires, although in a less degree, dangerous in winter.

This leads us to speak of the variation of the conductibility with the temperature.

It is shown, from the experiments made by M. Mathiessen and described in the *Philosophical Transactions* of the Royal Society of London, that the variation of the conductibility, K, with the temperature t, can be represented by an equation thus:

$$K = a - bt + ct^2,$$

in which a, b and c are positive constants, but b is already a small number, and c is at least 100 times smaller than b for the different metals and alloys tried by M. Mathiessen. If this equation is represented by a curve, the abscissæ showing the temperatures and the ordinates the conductivity, we have a parabola the concavity of which is turned towards the positive part of the axis of y. The lowest point of the curve is given by the formula:—

$$\frac{dk}{dt} = -b + 2ct = o,$$

whence—

$$t = \frac{b}{2c}$$

a rather high temperature, which gives for the minimum of conductibility:—

$$K = a - \frac{b^2}{4c}.$$

In short, this value of K is very near to a, but we shall in future give, for each country, the mean value of the conductibility for the mean temperature of the country.

We may now say that the experiments which we have made up to the present, and which we shall continue with the greatest attention, allow us to think seriously from this time forward of using wires of phosphor bronze for overhead telegraph lines.

We might say much more on this subject, which has now become so important, but we do not wish to tire the reader by a too lengthy account of the observations which we have made personally at our own works as well as in all parts of Europe where the phosphor bronze wire is used.

Let us conclude, however, by expressing a hope that we shall soon see the ideas of M. Marcel Deprez take a tangible form. When the transmission of force to a distance by electricity becomes an accomplished fact, phosphor bronze will play an important part in it. It will be used for the transmission of force. Dynamo-electric machines will be required, with vertical rotation, for which it will be necessary to use pads, resisting the friction, and not easily heated—in a word, pads of phosphor bronze.—*L'Electricien.*

LAZARE WEILLER.

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PUBLISHED SEMI-MONTHLY AT 23 PARK ROW.

P. O. BOX, 3329.

GEORGE WORTHINGTON, - Editor and Proprietor.

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United States and Canada, postage prepaid.
To foreign countries postage added.

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NEW YORK, APRIL 1, 1882.

DEALERS SUPPLIED WITH THIS PAPER BY

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The Effect of Protection on Telegraph and Telephone Supplies.

Without advocating either of the much-contested principles of protection and free trade, we wish to inquire, without bias, into the effect of the present tariff system on the prices of telephone and telegraph apparatus of all kinds, and thus upon the cost of telephone and telegraph service.

Beginning with the first thing required in a telephone line, the price of wire is found to be increased by the protective tariff nearly one hundred per cent. That this is an important item in telegraph and telephone construction, no one can doubt who has the slightest acquaintance with the business. When it is considered that two hundred miles a day of telegraph wire is used by one telegraph company alone, at a price not less than twenty dollars per mile, the cost of this single item in telegraph construction is shown in its true aspect. The same expense has, of course, to be borne by the telephone companies, and the proportion of the expense for wire to the rest of their expenses is even larger for telephone companies than telegraph companies.

Not only the wire, but also all the bolts, washers and spikes cost the telegraph and telephone companies double what they would if there were no protective tariff.

All kinds of insulators, also being subject to a protective duty, are furnished the telegraph and telephone companies of the United States only at an advanced price over their actual cost, or what it would be without such protective duty.

Next comes the copper wire, on which the duty is forty-five per cent. This extra charge, of course, has to come out of the telegraph and telephone companies, who in turn must reimburse themselves out of their subscribers.

All parts of the batteries used by the telegraph companies are subject to duty which must render the service accordingly expensive. The metal used in the instruments for telegraph and telephone purposes, being all dutiable, the tools with which such instruments are made being dutiable, all this must be paid for to the manufacturer, first by the telegraph and telephone companies who purchase the goods, then by the public who makes use of the telegraph and telephone service.

In looking over the whole field of telegraph and telephone material, we find hardly a single article which is not, in part at least, protected by the tariff, thus costing from twenty-five to one hundred per cent. more to the public, with an average of perhaps between forty and forty-five per cent. above the actual cost of these goods; that is, what the cost of these goods would be if without restriction the purchaser could buy where he could get the cheapest.

It is a common thing for people to compare the service of the telegraph in the United States and in Great Britain, ascribing the greater cheapness of the service in Great Britain to the fact that it is controlled by the Government, and deducing the conclusion that, if the telegraph were under the Government control in this country, rates could be brought to the same basis. Whether this conclusion be true or not, there is evidently a factor in the problem which is not usually considered; that is the extra cost of telegraphic materials used in this country. It would rather appear that the profits made on telegraph business, under the additional expense which the telegraphic companies are subject to in this country, is due to private management, and that the putting of the telegraph under Government control would not only make the service worse, but the actual profits of the telegraph less to the public.

It is a noticeable fact that the manufacturers of telegraphic apparatus and dealers in these supplies are not greatly affected by the protective tariff. It perhaps sometimes occasions them annoyance, but it rarely occasions them either loss or gain, unless, perhaps, in competing for trade in Canada and Mexico.

We learn that Mr. V. F. Butler, the enterprising manager in Cuba of the Compañia Electrica de Cuba, and who has a telephone exchange in successful operation in Havana—a few days since, gave several subscribers an opportunity to hear the performance at the Tacon Theater, while sitting in their own rooms. Connections were made similar to those by which the veteran musician, Mr. Fry, of New York, so long enjoyed the opera at the Academy of Music, though confined to his room by sickness. Mr. M. S. Gardner, formerly of the Met. Tel. & Telephone Co., of N. Y., now Mr. Butler's assistant at Havana, was in charge of the exhibition. The Havanese were much delighted with the experiment.

As an illustration of the present widespread interest in electrical matters, it may be stated that seven papers are the great dynamo whose cylinders generate the electric light of universal knowledge devoted to electricity and its applications, which are now published regularly in Paris.

We wish to thank Messrs. Maw & Dredge, proprietors of *Engineering* (London) for kindly furnishing us files of their valuable journal. Their paper speaks for itself; it has no equal.

Our Paris correspondent, Prof. Grignard, kindly calls our attention to the following:

"In your number of February 15, in the article on 'The Telephonic Question in Belgium,' you commit an error in associating the Société Générale with the article which speaks of Belgium alone. The Société Générale des Téléphones does not operate in that country. We were, it is true, in liquidation, and are now working on a capital of 25,000,000 francs.

"In the number of March 1, article on 'Ader's Magnifying Telephone,' you are again in error (let me say here that I worked that instrument with him, and know it thoroughly). The songs are not hummed in front of a microphone, but in front of a make-and-break, or interrupter. There are, of course, no carbons and no bobbins. The receiver is formed of a trumpet, but there is no mouth piece, and it is not (what there is of it) attached to a diaphragm. I did not see the article in *La Lum. Electrique*, but either it has been badly translated or the *Lumiere* was misformed."

We are under obligations to the enterprising publishers, Messrs. Houghton & Co., of 10 Paternoster Row, London, E. C., for files of their valuable paper, the *Telegraphic Journal and Electrical Review*. This newly-enlarged and ably-edited journal now stands at the front of European electrical journals.

According to the *Journal of Arts*, London, the substitution of electricity for coal is to be looked for in more directions than one. It says that it by no means despairs of learning that coal is no longer needed directly even for metallurgical operations, for it is beginning to appear that electricity is able to do that in the way of smelting refractory materials which has hitherto been done entirely by the expenditure of fuel.

Taken in the abstract, the culmination of inventive genius in the line of communication was reached by the transmission of articulate speech. There can be nothing beyond except the perfection of the instrument, and the development of the uses to which it can be applied. From a lively interest as a scientific toy, the telephone has advanced to the telephone as an investment for capital, as a fully-established business of enormous proportions, and as a means of livelihood for thousands of active men and women. It is therefore the practical side of the question with which we have to deal: dividends to stockholders, good service to patrons, pleasant and remunerative occupation for those employed. A telephone exchange, giving good service, will have patrons who are willing to pay liberal rates, and this is the beginning and the end (assuming fair business management). To give good service, a strict attention to the details is of vital importance; and, in this particular, we are con-

strained to say that either through misconception, negligence, or imperfect apparatus, a large number of the exchanges are at fault.

A successful manufacturer is always on the alert, in order to reduce the cost of production by cutting off useless operations. He will point out with pride where he has been able to reach a certain result by one operation, where it required two or more in the old way. We are manufacturers of telephone connections; and, if by our particular system it requires, say four motions or operations to make a connection, and if, by a different device we reduce it one, we have saved one-quarter of the time, and when the "rush" comes the operator can respond to the calls in three-quarters of the time that was required before; and, if by further improvement we reduce them still more, it will be accompanied by equally satisfactory results. As in manufacturing, even the distance which the hand is moved should be taken into account. Other prolific sources of vexation and expensive delays occur, by imperfect connections at the switch-board, by neglect in the adjustment of transmitters, bad terminal ground connections, "listening in or off" through a ground at the central office, which is always done at the expense of the longest line. All these and many others, too numerous to recount in a single article—but which it is our intention to write up from time to time—make it necessary for the operator to interpret the message to the subscriber at a loss of time; and all goes to show that it is the little things that make up the aggregate of good service, and must be looked after to produce the results sought for by those interested.

Should we be instrumental, even to a degree, in building up and improving the business and service, it will be pleasant to reflect that the REVIEW has at least shared in the effort for the general good.

—*Thomas B. Doolittle.*

A Cheap Voltaic Cell.

In a paper read recently before the Glasgow Philosophical Society is a description of a new and cheap form of voltaic cell, which, though not thoroughly tested, promises to be useful. Take an old tinned iron can—one that has contained preserved meats answers well—and place within it a porous cell, made preferably of earthenware, though a diaphragm of canvass will answer. Pack the space around the porous cell with iron borings or filings, which may be swept from the floor of an engineer's workshop. Fill the cell with a solution of commercial potassium hydroxide. Insert a strip of common zinc in the solution connect the zinc and can with the wires of an electric bell, and a powerful current is at once indicated. The alkaline solution should be carefully preserved from the air by an air-tight stopper to the cell or other contrivance, but the iron borings should be fully exposed.

MORSE AND WHEATSTONE TELEGRAPH PAPERS.—The London *City Press* states that the contract to supply her Majesty's Government and the Post Office with printing papers in endless coils for the Morse and Wheatstone instruments has been secured by Messrs. Waterlow & Sons (Limited). The contract comprises, in the aggregate, about 700,000 coils of paper, weighing 170 tons, and upwards of 156,000 miles in length.

An electric signal apparatus on a French railway causes the blowing of a steam whistle upon a locomotive approaching a danger signal. The engineer is thus warned. This apparatus is found valuable in fogs and snow storms, when ordinary signals often escape notice.

The International Exhibition at Buenos Ayres was opened on the 15th instant.

Electric Motors.

The probability that nearly every large town or city will soon be supplied with large quantities of electricity for lighting purposes has given rise to considerable interest in the plan of making use of the same supply for producing power for light household work. Several small motors have been devised to meet the expected demand. The first of these little machines was constructed about three years ago by M. Marcel Deprez, and was found to work effectively. A second apparatus of this kind has for some time been used by M. Trouve, an electromagnet being used in place of the permanent steel magnet of Deprez. This motor drives a sewing machine very readily, although it is of very small size. Trouve's little electric canoe at the Paris Electrical Exhibition was propelled by some of these engines, and Tissandier has suggested their use for balloon steering. The last and best motor is that of Mr. Griscom, the American electrician. One of these powerful little machines, four and half inches long, and weighing little more than two pounds, will run a sewing machine very rapidly with a small expenditure of electric energy. The lack of labor-saving conveniences in the household has often been deplored, but the introduction of electricity seems to offer a source of power which may serve in many ways to lighten the toil of the weary housewife.

ON ELECTRIC ACTIONS IN SIMILAR CONDUCTIVE SYSTEMS.—By M. Marcel Deprez.—It is not always easy, if the actions which are developed under the influence of an agent in a system of given dimensions are known, to foresee *a priori* the actions which will be developed in a system of different dimensions. If the agent is heat, the solution of the problem is very complex. If, on the contrary, it is electricity, the solution may be obtained. If we augment all the dimensions of a conductive system of any form soever according to a given ratio K, without changing the electric flux which traverses the unity of a section of the wire, the resultants of all the elementary static efforts increase as the fourth power of K. If the volume and the form of a conductive system are invariable, a given static effort requires always the same expenditure of effort to be produced. If all the dimensions of a conductive system are increased in the ratio K, one and the same effort F is produced with an expenditure of energy K times smaller.—*Comptes Rendus.*

Last year the legislature passed a law exempting from taxes American registered vessels. The law, which was recommended by the Governor's Taxation Commission, was designed to aid American owners to compete with foreign owners. Up to last year an American ship was taxed 2½ per cent. on its value, while foreign vessels were practically untaxed. Thus the Pacific Mail Steamship Company was taxed on its capital of $2,000,000. It has paid no dividend in fifteen years. Only four of its twenty vessels come to New York; yet all were taxed there. In 1880 the tax was $104,000. In fifteen years it has paid $1,000,000 in taxes. Its English competitor, the Atlas line, has paid dividends, has grown from two ships to ten or fifteen, and has paid $25 a year on its office furniture, valued at $1,000. In this way American commerce is protected. Yet there are men who want to repeal the law of last year.

It has been discovered by M. Tomasi, that surrounding the electric arc by tubes filled with cold water produces a great effect upon it, the luminous power being much weakened, and the arc itself so much affected that a light puff would extinguish it.

Reiss's Apparatus for Reproducing Musical Sounds.

The appararatus devised by Reiss, we believe in the year 1861, appears to be the first for reproducing musical sounds at a distance by means of electromagnetism. The late trial in Edinburgh of the United Telephone Company *vs.* Maclean has brought forward in a very prominent way the arrangement which Reiss evidently *intended for musical sounds simply*, and not for the purpose of reproducing articulate speech. However, during the proceedings in connection with the above contest, this apparatus was held up as a prior publication to the Bell and Edison patents; and although favorable and adverse opinions were expressed as to its use as a telephone transmitter, the subject has assumed an importance that it is unadvisable to overlook, and we therefore propose to make an attempt to place the action of Reiss's invention in its right light, and to correct some misapprehensions which now exist as to whether it is really a reproducer of musical sounds only, or whether it can actually be made to reproduce articulate speech in the proper sense of the term.

The best known arrangement of Reiss may be explained in a few words. A hollow wooden box with two apertures, one at the top, the other in front. The upper hole has tightly stretched across it a membrane of bladder, vellum, &c. A mouthpiece is inserted in the opening at the front of the box. When one sings into the mouthpiece, the membrane above vibrates exactly with the vibrations of the voice. A piece of platinum plate is attached to the center of the membrane, and has a battery wire attached. A platinum contact point presses the platinum plate and forms part of the circuit. As originally intended, when vibrations are set up by any means in the instrument, the contact is alternately made firmer and then broken altogether, these makes and breaks of course being more or less rapid according to the pitch of the sound, or, in other words, in exact proportion to the vibration set up by the voice. Without entering into a definition of the meaning or causes of sound, we may say that musical sounds, as distinguished from noises, are those which produce a *continuous* sensation and whose values can be musically determined. They depend upon three qualities—*pitch*, *intensity*, and *timbre*, or quality. It is this latter property which it is most difficult to understand. For instance, two instruments—say a violin and a flute—may each produce a note of the same pitch and of the same intensity, yet the quality of the two notes is entirely different. Two voices may also equally differ in quality, and as we have been only alluding to musical sounds, it will be readily understood what complex vibrations are set up in articulate speech, when we not only distinguish the difference in the quality of voices, but are also able to distinguish one word from another, although they may be spoken in the same tone of voice, but the shapes of which, if we may use the term, are controlled by the larynx before the vibrations enter the surrounding space.

It has been asserted that Reiss's original apparatus has transmitted articulate speech (we are not concerned at present with the kind of receiver employed), and that it can be made to do so again. This we are not prepared to deny, but probably its truth is attributable to a cause which we do not think has been yet touched upon. Now, it appears to us that whenever articulate speech has been transmitted by this instrument, it was working under entirely different conditions to those intended or thought of by the inventor. When the postal authorities took action in 1880, for the purpose of establishing their claim to the telephone as a telegraph instrument, we believe numerous experiments on articulate speech were then carried out with Reiss's invention, his apparatus being used as a transmitter. Words could be distinguished at

the receiving end when the transmitting instrument was spoken into in a very *gentle* tone of voice. We do not mean a low tone as regards the number of vibrations of the voice, as this might be of any pitch, so long as it was kept gentle or soft, and therefore that the amplitude of the vibrations did not exceed a certain range.

It is quite possible that the contact of the platinum point on the plate might be so adjusted, that when speaking into the mouthpiece gently, the forward motion of the membrane would produce a firmer contact between point and plate, and that the receding movement would only reduce the normal pressure, without actually breaking contact between the two at all, the result being vibrations in a closed circuit. Such a movement would produce corresponding fluctuations in the resistance of the circuit of a sufficient degree to reproduce speech; but then the action is not that of a make and break, but simply that of a "tension regulator," as described by Edison, or of the microphone of Hughes. If we examine Reiss's instrument as a make and break apparatus simply, it appears evident on the face of it that articulate speech in the proper acceptation of the term cannot be produced; for although we can have varying degrees of contact, that is to say, it may be firmer and closer at one minute interval of time than at another, we cannot have variations of make and break. Therefore as long as sounds are transmitted by makes and breaks, it is certain that although the vibrations may be reproduced in a receiver with perfect similarity as far as their number and interval are concerned, they cannot give their amplitude, and, therefore, however loudly one may sing into a Reiss transmitter, when *acting as a make and break*, the voice cannot be reproduced beyond a certain strength at the receiving end. It will therefore appear plain that such an instrument can only produce one of the three necessary qualities of sounds, viz., pitch. Its waves or vibrations would always be of the same amplitude, because although by speaking or singing into the instrument with varying degrees of loudness, we might vary the resistance of the make, we cannot have the corresponding vibration of the break qualified in the slightest degree. We may therefore conclude that when articulate speech has been manifested to any experimenter when using this apparatus, the action has been that as before described, and not a make and break. It has been attempted by many to explain the action of the Hughes microphone, by attributing its powers of transmitting the human voice in articulate speech to its exquisite delicacy of make and break. Here again we may say that it is impossible to conceive such a thing as delicacy of *make* or *break* in an electrical circuit.

Indeed, we think that one fatal objection to such an explanation of its action is to be found in the fact that in the microphone all its constituent parts are attached to the same support, and must vibrate as the support vibrates either backwards or forwards. It is, therefore, difficult to imagine any break taking place at any time in the Hughes microphone when properly adjusted for transmitting speech. 'It has been said in proof of breaks occurring, that minute sparks have been observed at the points of contact of the carbons employed. This does not prove in the least that an actual break takes place, but only that the current when passing from one carbon to another, by various paths represented by the number of points or molecules in contact, had certain of these paths ruptured, hence the sparks.

For instance, if we connect a number of incandescent electric lamps between two conductors, and break one away, we shall see a spark, but the whole circuit is not broken, but only one of the numerous paths open to the current. We may therefore safely assume that even this apparatus of Professor Hughes cannot be explained by a make and break action. It might be simply illustrated by comparing the vertical carbon pencil to a cork floating in the ocean. The cork will be buffeted about according to the amplitude of the waves, but is never thrown out of the water. So it is with the carbon pencil. It is moved or shaken about more or less rapidly and vigorously according to the number and amplitude of the vibrations produced by the voice, but we cannot imagine it leaving its connection with the other carbons. In fact, at the bottom point at any rate its own weight would be sufficient always to keep it in contact, however slight. Returning to the question of Reiss's invention, it is not our province to decide as to whether it constitutes a prior publication in the controversy now going on, as to the validity of certain patents for the invention of transmitting articulate speech by electricity. It seems evident that the apparatus of Reiss may be employed for the same purpose as the Edison "tension regulator" or Hughes' microphone, but it must be by variation of *contact* only, which must not at any time give way sufficiently as to constitute a break in the circuit.

It appears clear that Reiss did not anticipate the wonderful results which he might have obtained from his simple apparatus by altering its mode of action, therefore it is hardly probable that his invention would stand in the way of a patent for other effects which he did not foresee, simply because we, with the knowledge we now possess, can adapt to a certain extent his apparatus for the same purpose.—*Telegraphic Journal and Electrical Review.*

Curious Electrical Phenomenon.

A correspondent of *Nature*, writing from Savoch, Aberdeenshire, tells of a curious incident which recently befell him. "On February 18," he says, "this part of Scotland was visited by a furious gale of wind, rain, sleet, and hail. The gale subsided considerably about five o'clock in the afternoon. At eight o'clock the sky was fairly clear, when a black cloud sprang up in the north, and the night became suddenly intensely dark. With the darkness came a tremendous shower of hail. All at once I was startled by a vivid flash of lightning close at hand, but without thunder. At the same instant I found myself enveloped in a sheet of pale, flickering white light. It seemed to proceed from every part of my clothes, especially on the side least exposed to the hail, and more particularly and brightly from my arm, shoulder, and head. Though I turned about pretty smartly, and shifted my position, I found it impossible to shake off the flickering flames. When I walked on they continued with me for two or three minutes, disappearing only when the violence of the blast was somewhat diminished. I felt no unusual sensation beyond the stinging of the hail, and no sound except that of the storm. Then and since I have puzzled myself to account for the strange phenomenon, and can only imagine it to have been a peculiar manifestation of St. Elmo's Fire, so well known to sailors during thunderstorms within the tropics. Some of your readers may, perhaps, be able to give instances of a similar occurrence, unique both in my experience and reading."

Electrical Progress in Vienna.

An exhibition of electricity and in its various uses, after the plan of the late Paris Exhibition, will be held in Vienna during the coming summer, under the management of Count Wilczek and Baron Victor Erlanger. It will be held in the central building of the International Exhibition of 1873.

The Telephone Exchange, opened in Vienna in December last, is said to be doing well. By the middle of February there were three hundred subscribers, and connections were being made with two hundred more. The charge is 100 florins, or about $40, a year.

A very successful trial has just been made of the Brush system of electric lighting in Vienna. The Place of St. Stephen and the neighboring streets were lighted with fourteen lamps, with such excellent results that preparations are making for the electric illumination of the famous Ringstrasse, the finest avenue in the city if not in Europe. One hundred and thirty Brush lights will be required. The light will also be introduced into public and private buildings.

Engraving on Glass by Means of Electricity.

M. Plante has succeeded in engraving on glass by means of electricity. The process is as follows: The glass is laid in a horizontal position, and covered with a concentrated solution of nitrate of potash, the liquid being retained by a shallow vessel in which the glass is placed. A platinum wire is dipped in a horizontal position in the solution along the edges of the glass. The wire is attached to one of the poles of a secondary battery of fifty or sixty elements. The lines are traced by hand with the point of an insulated platinum wire, connected with the other pole of a battery. The parts of the glass covered with the alkaline solution become engraved when touched with the end of the platinum wire, however rapidly this is moved, the thickness of the lines varying with the thickness of the wire. The currents from either pole may be used in the writing wire.

Planning a Second East River Bridge.

A meeting of prominent citizens of Queens county was held yesterday at Jamaica to listen to an address by Dr. Thomas Rainey upon the proposed Ravenswood and New York bridge over the East River. Dr. Rainey said it seemed strange that 800,000 people should exist upon Long Island with such slow, insufficient, uncertain means of communication with the metropolis as they now have. He believed rapid transit, by means of a bridge running from Ravenswood, L. I., to the upper end of Blackwell's Island, and thence to the block between Seventy-sixth and Seventy-seventh streets, New York, was necessary. Clark, Reeves & Co., the Phœnixville bridge builders, had estimated that such a bridge would cost $6,394,000. They had contracted to furnish the iron for its construction for $800,000. The managers of the east side elevated roads had promised to run trains over the bridge after its completion. Under such circumstances Jamaica could be reached from the City Hall in New York in thirty one minutes, and Coney Island in twenty-six minutes.

Dr. Rainey thought that Long Islanders should have control of the bridge. The company intend to issue stock to the amount of $6,000,000, in shares of $100 each, and he hoped that the people of Long Island would subscribe liberally. The meeting passed resolutions stating that "the bridge commenced by the Long Island Bridge Company is a great public necessity," and approving the financial scheme and the plan of the structure. A committee of eighteen, with power to call a meeting, was appointed to examine matters relating to the proposed bridge and report thereon.

Pile Driving by Electricity.

The successful application of electricity in new fields of labor continues to be recorded. At Hatfield Park, the seat of the Marquis of Salisbury, the piles to support a coffer dam across the River Lea have just been successfully driven by the power of a water wheel situated at a distance, which power was transmitted by two dynamo machines to the gearing connected with the pile driver of ordinary construction, erected on a barge floating in the river. The machinery worked well, lifting a monkey weighing about four hundred weight with ease and regularity. It is not stated how far the power was transmitted. By a French experiment, M. Deprez has succeeded in obtaining useful work after the current had passed through forty-nine miles of ordinary telegraph wire.

"Low Bridge!"

HEIGHT OF THE EAST RIVER BRIDGE FLOOR BEAMS ABOVE HIGH WATER MARK.

The Pilot Commissioners have been furnished with a sketch of the East River Bridge, showing height in the clear of the floor beams above mean high water in main span, taken at noon March 2, temperature fifty-five degrees. From it it is learned that 50 feet from the dock of either tower the height of the bottom of the floor beams above mean high water is 117 feet; at 200 feet distance from either dock the height is 122 feet; at 350 feet the height is 128 feet; at 500 feet it is 135 feet; at 525 feet the height above mean high water is 1 foot less—134 feet – on account of a temporary obstruction; at 650 feet from either dock, the height is 140 feet, and at 750 feet from either dock, where the center of the river span is located, the height is also 140 feet. The height of the top of the towers above mean high water is given as 278 feet, and the distance from the center of one tower to the center of the opposite one as 1,595 feet 6 inches. As many canal men have been noticed to duck their heads quickly while passing under the great structure on hearing mischievous urchins on the docks shout out "Low bridge!" "men who go down to the sea in canal boats," via the East River, would do well to paste the above table in their hats for reference.

A Park for the New District.

The Park Commission established by the Legislature, composed of Mayor Grace, Tax Commissioner Austin, Commissioner Thompson, of the Department of Public Works, and President Sauer, to consider and report upon the necessity for the establishment of a park in the Twenty-third and Twenty-fourth Wards, held a further meeting lately in the Mayor's office, which was largely attended by property holders in the annexed district. Mayor Grace stated the object of the meeting, when the Hon. W. W. Niles read a carefully-prepared paper in advocacy of the proposition for the increase of the park area of the metropolis. He said that those who were disposed to question the accuracy of an estimate which puts the population of New York in 1892 at nearly 2,500,000, are referred to the census of the past decades, which show as large a relative increase. He asked what portion of this vast multitude would reside South and which part North of Harlem River.

The Electric Light Made Safe.

Mr. Edward Atkinson reports to Boston underwriters, after a careful investigation of the subject, that the electric light can be made perfectly safe without much difficulty Such an opinion, coming from such a source, is very encouraging, for there have been grave fears that the use of electric light would increase the danger of fire. Mr. Atkinson thinks the incandescent light can be made perfectly safe, and that the arc light can be made as safe as gas or oil light, at least. The danger of contact with telegraph, telephone, and other electric wires is so well known that he considers no warning against it necessary. The danger of "cross arcs"—the diversion of the electric current from one wire to another across damp woodwork or any other conducting surface—is pointed out by him, and he suggests that two wires should not run along the same beam, nor be brought within a foot of each other without the best insulation. By protecting exposed wires with lead, hard rubber, stoneware, or other satisfactory material, by testing the whole system daily before lighting in order to remedy faults of insulation, the use of electric light, from wires laid in accordance with the best scientific methods, can be made perfectly safe in any city, says Mr. Atkinson. His opinion will remove a troublesome doubt from many minds.—*New York Mail and Express.*

Electrical Patents in the United States.

The subject of patents has always been an interesting one in the United States, but it seems to be on the increase even now.

During the year 1881 nearly 16,000 patents were granted in the United States, a larger number than was ever granted before in this or any other country.

By order of Commissioner Marble, of the Patent Office, all United States patents appertaining to or bearing upon electricity granted prior to July 1, 1881, have been reprinted, and the drawings thereof reproduced and bound up in neat substantial quarto volumes of about two thousand pages each. There are sixteen such volumes, the subject matter of each being of such sub-classes as naturally relate to each other, thus giving in each volume a full resume of the state of the art from its origin to date. There were issued to, and including the above date, 3,825 such patents, which are subdivided into sixty-nine sub-classes.

The following table shows the number of each particular kind of patent which relates directly to the telegraph, to wit:

Telegraphs		46
"	(automatic)	111
"	(dial)	23
"	(duplex)	61
"	(dynamo)	8
"	(multiplex)	7
"	(perforating)	26
"	(printing)	191
"	(quadruplex)	19
Circuit closers		31
Condensers		5
Electro-magnets		42
Keys		42
Lightning arresters		8
Morse registers		20
Relays and sounders		111
Conductors		149
Insulators		107

In duplex and multiplex telegraphy there has been but little advance, but there are pending applications for patents for several valuable inventions.

In telegraphs and telegraph apparatus but slight advance is apparent, the leading inventions being in the applications of dynamo instead of batteries for telegraphic purposes.

There is also much interest manifested in relation to the Faure secondary battery, and applications are pouring in upon that subject, but as yet nothing appears to be any advance upon what Faure has done. There is, however, as much interest developed in dynamo machines, and there are at present pending over 150 applications.

The telephone occupies the minds of would-be patentees to a wonderful extent. The first telephonic telegraph patents were granted in 1875, and before January 1, 1878, they numbered less than two dozen. Now they constitute in all eight subdivisions, embracing all kinds of telephones, telephone telegraphs, alarms, calls, appliances, &c., all told, 438 patents.

A large interest is also apparent in telephones and telephone exchange systems, and there are pending over two hundred applications on these devices.

Some idea may be formed about the interest manifested in America as to the future of the electric light when it appears that there are now pending over three hundred applications for patents on various features thereof, a large majority of such applications being for what is known as incandescent patterns and their appliances.

Taking the subject of electrical patents as a whole the most activity has been exercised within the following during the past three years: 1st, electric lights; 2d, dynamo machines; 3d, telephones and their appliances. Prior to January 1st, 1878, there were only twenty patents on electric lights; July 1, 1881, there were 192. Prior to July 1, 1879, there were only nineteen dynamo and magneto machines. July 1, 1881, shows 111.—*Journal of the Telegraph.*

Proposed Amendments of the Patent Laws.

Elsewhere will be found the text of a bill (H. R. 4,949), introduced in the House of Representatives, March 6, by Mr. Morgan R. Wise. Most of its features are highly commendable.

The first clause aims to prevent fraud upon "innocent purchasers of patent rights" by making it the duty of intending purchasers of such rights to take reasonable precautions against being cheated; such precautions as any intelligent business man would be sure to take, or would regard himself foolishly careless if he did not take.

This clause strikes at the root of much of the complaints against the patent system. Men who stupidly or with criminal intent purchase alleged patent rights without investigation should blame themselves and not the Patent Office when their ventures prove unprofitable. They have no right to pose as innocent victims of the law, or to besiege Congress for relief from their folly at the cost of honest inventors and patentees.

The latter part of the section provides a fine not exceeding $1,000, or imprisonment not exceeding three months, or both, for fraud in the selling of patent rights by the use of forged or altered patent specifications, claims, or drawings.

The second section of the bill provides corresponding penalties for fraudulent patent sales, wherein the seller pretends to convey rights or privileges which have previously been disposed of, wholly or in part, to others.

Section three is designed to facilitate the work of the Patent Office, and enable it to comply with the terms of the law without antedating or reallowing patents the final fees for which are paid at the end of the six months' limit.

Section 4 makes it possible for the owner of a properly-assigned patent to obtain a reissue without the signature of the inventor, who has ceased to be a party in interest.

Section 5 makes the life of an American patent absolute and not as now contingent upon the life of any foreign patent upon the same matter which the inventor or another may have taken out. This is a proper and very desirable provision.

Section 6 contains two provisions, both commendable. The first is that a reissued patent shall not cover any machine or article the production of which was begun during the existence of the original patent, but not subject to it When an inventor omits to claim what he might properly have claimed in a patent, it is fair that he be allowed to correct the oversight within a reasonable period; but it is not fair to allow him to make the correction the means of dispossessing or restraining another in an industry lawfully begun. The latter part of the section provides that the surrender of a patent for reissue shall not cause any forfeiture of rights which had accrued under the patent previous to its surrender.

Of the forepart of Section 7, we cannot speak so favorably. It fixes a price for the *Patent Office Gazette* to American subscribers very much lower than its actual cost, and provides a higher rate for foreign subscribers. The office would receive no benefit from this discrimination, for the simple reason that the foreigner would buy through an American agent. The purpose of the diminished price is to diffuse mechanical knowledge and encourage invention. The diffusion of knowledge is no part of the function of the Patent Office; the encouragement of

invention is; but the method prescribed by the Constitution for the carrying on of this desirable work does not include the publication at a loss of *Official Gazettes* or any other literature, however valuable or useful.

The proposed reduction in the price of copies of patent specifications, claims, drawings and related matter seems to be entirely reasonable. If incorporated into the patent laws the first section of the bill would create a largely increased demand for such papers, and the prices named would appear to be ample to cover cost.

The sections of the revised statutes which Section 8 would repeal relate chiefly to the extension of patents granted prior to March 2, 1861 — sections which expire by natural limitation this year.

The provisions of this bill, with the single exception noted, are so well calculated to "amend" the patent laws in the best sense of the word that its early passage is much to be desired.

In place of the objectionable portion of section 7, we should be glad to see a clause making it the duty of the Commissioner of Patents to provide in the Patent Office better facilities for an examination of its records. The records are intended to be, and to a great extent are, open to public inspection; but, in the absence of special provision for such work, it is practically impossible for an inventor, an intending purchaser of patent rights, a manufacturer, a student of any department of invention, or other citizen, to make an examination of the records of the office that he can be sure is complete and thorough.

What is needed is a room or rooms set apart for the purpose indicated—a place where the searcher could have brought to him for examination copies of every record relating to the subject he is investigating; a room provided with complete indexes of all the records of the office, in charge of attendants able to aid and advise the searcher, as a competent librarian aids the searcher for special information in a great library.

Something of this nature would be of great public utility, and the need of it must increase with time and the rapidly-accumulating records of the office. The patents in many departments are now so numerous that, even at the low price fixed for them in the bill in hand, few inventors could afford to buy them all; and, if they could, it would, in many cases, be much more advantageous to search the records on the spot.—*Scientific American.*

Paris Academy of Sciences.

M. Jamin in the chair. The following papers were read: Meridian observations of small planets at Paris Observatory during the last quarter of 1881, by M. Mouchez.—On some applications of the theory of elliptic functions, by M. Hermite.—Double salts of Mercury, by M. Berthelot. This relates to double iodides and chloroidides.—Note on permanganate of potash considered as an antidote of snake poison, *apropos* of a publication of M. de La cerda, by M. de Quatrefages. Vipers abound in Haute-Marne and some other departments in France, as is proved by the large numbers killed in consideration of a small premium on each viper. While the larger animals often recover from a bite, goats, sheep and dogs often succumb. The effects on man, too, may be serious and even fatal. M. de Quatrefages desires the new method (some details of which he gives) to be made known. He also suggests it might be of use against the diseases treated by M. Pasteur.—Researches on a special influence of the nervous system causing the stopping of exchanges between the blood and the tissues, by M. Brown-Sequard. Lesion of almost any part of the nervous system will cause this stoppage, which is more pronounced the more sudden the cause. The effects are chiefly these: The venous blood becomes like arterial in color; it holds less carbonic acid than normally; there are no convulsions before death; the body temperature falls; the blood vessels contract; after death blood is found in the left heart, and the properties of the spinal cord, nerves and muscles persist.—Action of high atmospheric pressures on the animal organism, by M. de Cyon. To M. Bert's apparatus he added arrangements for measuring the variations of blood pressure, pulsations and respiratory movements, and for stimulating sundry nerves. He finds that oxygen is not a special poison for the organism; animals die at high atmospheric pressures, simply because the carbonic acid (the chief excitant of the vasomotor and respiratory centers), diminishing considerably, circulation and respiration stop; the former because of too great lowering of blood pressure, the latter because of apnea. The heart beats are accelerated for the same reasons, the oxygen increasing the action of the accelerating nerves, while the moderating action of the pneumogastric is lessened through failure of carbonic acid.—On the parasite of malaria, by M. Richard. This has been called by M. Lavaran *oscillaria malariæ*. M. Richard has traced its development, in the red corpuscles, into a collar of dark granulations (displacing the hæmoglobin). Escaping, it appears like a flexible rod or whip; the thin end sometimes get caught, and the organism then oscillates violently as if to free itself. In about an hour it dies. Generally, however, the parasite is inert. The parasitiferous corpuscles lose elasticity and become very viscous; hence they accumulate in the capillaries.—*Nature.*

Malarial Germs.

M. A. Laveran has found, in the blood of patients suffering from malarial poisoning, parasitic organisms very definite in form andmost remarkable in character; motionless, cylindrical curved bodies, transparent and of delicate outlines, curved at the extremities; transparent spherical forms provided with fine filaments in rapid movement, which he believes to be animalcules; and spherical or irregular bodies, which appeared to be the "cadavaric" stage of these, all marked with pigment granules. He has also detected peculiar conditions in the blood itself. Dnring the year that has passed since he first discovered these elements, M. Laveran has examined the blood in192 patients affected with various symptoms of malarial disease, and has found the organisms in 180 of them, and he has convinced himself by numerous and repeated observations that they are not found in the blood of persons suffering from diseases that are not of a malarial origin. In general, the parasitic bodies, were found in the blood only at certain times, a little before and at the moment of the accession of the fever; and they rapidly disappeared under the influence of a quinine treatment. The addition of a minute quantity of a dilute solution of sulphate of quinine to a drop of blood sufficed to destroy the organisms. M. Laveran believes that the absence of the organisms in most of the cases (only twelve in the whole 192) in which he failed to find them was due to the patients having undergone a course of treatment with quinine.

The Paris Faculty of Medicine has collected some statistics relative to the medical profession. According to these statistics there are in the world 182,000 physicians with proper degrees. France possesses most doctors in proportion to her population, and there are few countries in which the profession takes such parts in politics. In the Chamber of Deputies alone there are forty medical men, including the well-known Mr. Clemenceau. Then the number of doctors who are Senators, Councillors-General and Municipal Councilors, amounts to the enormous figure of 6,000. In Paris alone 256 physicians contribute regularly to the newspapers or to medical journals.

The Removal of Scars and Cicatrices.

The cicatrices, scars, or marks left by various diseases, burns or wounds of divers kinds, are often less obstinately permanent than is generally supposed, and from some facts which have lately come under our notice we are inclined to think that their prevention or removal in many cases may be accomplished by some mild but effectual antiseptic.

Among the exemplifications of the efficacy of the formula we are enabled to lay before our readers, is the case of a gentleman of our acquaintance, whose face was so severely burnt by the violent spurting of a quantity of melted lead (owing to a workman having incautiously dropped a *wet* pipe into it), that his eyes were only saved by pebble spectacles from utter destruction.

At first, of course, carron oil was the sole application, and as for *weeks* afterwards particles of the granulated metal had literally to be dug out of the flesh, a deeply scarred countenance was naturally predicted by all, except the patient himself. One mark of an almost imperceptible character alone remained after the expiration of six months, owing, as our friend says, to the whole face being bathed twice or three times a day, as soon as the oil treatment could be discontinued, with a lotion of the simplest character, as is readily seen by glancing at its constituents.

Lint soaked in the same solution and allowed to remain on some little time will frequently mitigate the visible results of small pox, and we have known one case of ringworm treated in this way to leave no scar whatever, while a sister of the latter patient, who had had the same disease in a lesser degree, but had not employed this lotion, still retains the evidences of the fact.

The following is a convenient formula: Borax, half ounce; salicylic acid, 12 grains; glycerine, 3 drachms; rose water, 6 ounces. Make a lotion.—*Magazine of Pharmacy.*

At the instance of the Conseil d'Hygiène for the Department of the Seine, M. Delpech has drawn up an instructive report (*La Nature*) on the dangers arising from bees. The loss and inconvenience incurred by some sugar refineries in Paris through bee-keepers' establishments in the neighborhood, attracted notice some time ago. At the Lay refinery the depredation is estimated at 25,000 francs a year, and the workmen, nearly naked, are often stung. The children (1,200) at a school in the rue de Tanger, have suffered similarly to a large extent. M. Delpech gives information with regard to the bee's sting, notices three classes of injuries caused by it, and cites a number of cases in which it has proved fatal. Stings on the face are the most serious, the nerve-centers being so near. Bees are evidently not to be trifled with. On the triple score of material damage, great inconvenience, and very real danger, M. Delpech condemns bee-keeping in large centers of population.

Proposed New Railroad to Washington.

Senator Frye has introduced a bill to incorporate the National Railroad Company to build and operate a railroad line between New York city and Washington. Mr. Frye said he had examined the bill and approved its features. The incorporators are John B. Gordon, Jos. A. Jamason, Wm. A. Wallace, H. M. Hutchinson, George K. Chase, Noah L. Jeffries, John A. J. Cresswell and A. E. Davis. The bill guarantees that the time of mail service between the two cities will not be more than six and a half hours and that the fare shall not exceed $5.

Incombustible railway cars would be popular. Are they not possible?

Telegraphic and Telephonic Notes.

Telephontasia.

"HELLO!"
And a voice, not of earth, seems humming,
"Hello!"
How familiar old Fate is becoming!
No roundabout nonsense to tickle the ear
With compliments tangled in verbiage queer;
No majesty, rev'rence, milord or monsieur;
No mister, no madam, nor even my dear;
But just a quaint word from the gutter,
Coined only for *gamins* to utter:
That herald of bliss,
That precursor of woe,
With its kick or its kiss,
Evermore on the go:
"Hello!"

But, hold!
Would we have the world balk in the traces?
Why scold?
Even Time is improving his paces.
His scythe and his glass are no more to be seen;
There's a jaunty rig swathing his skeleton lean.
He will sit for his photograph next I ween
Astride an electrical mowing machine
And Fate would be working disaster
Should she ripen the harvest no faster
Than when the slow sand
In the skeleton's hold
Kept the world at a stand
As it sluggishly rolled
Of old.

Heigho!
Then it means that old fate is progressing!
Just so.
May we render due thanks for the blessing;
May we learn to forgive the rash blunder she made
When she madly consented to barter in trade
Her supple, keen, silent old Damascene blade
For that plebeian, gutter-born tongue grenade—
Busy making humanity shiver
With its impudent "stand and deliver!"
That brick on the fly,
Ever ready to go
From the low to the high,
From the high to the low,
"Hello!"

JOTHAM SAGE.

Mr. H. P. Copeland, of the Metropolitan Telephone and Telegraph Company, has been duly appointed agent of the Telegraphers' Mutual Benefit Association in the telephone interests, for the metropolitan district.

The Telegraphers' Mutual Benefit Association is an old and worthy organization. It is now in its fifteenth year, and on March 20th last had 2,183 members in good standing on its books belonging to the first division.

It had a reserve fund January 1st last of $21,000 of 7 per cent. W. U. Telegraph bonds. For the careful and business-like manner in which every detail is looked after by the officers of the association they cannot be complimented too highly. Every precaution is taken by them to protect the interests of the association, and it is largely due to this fact that it has met with its success.

The officers are as follows: President, Clarence Cary; Vice-President, C. H. Summers; Secretary, A. R. Brewer; Treasurer, Samuel M. Taylor.

All persons in the telephone or telegraph business between the ages of 18 and 45, and in good health, are eligible.

The average annual expense to each member has been less than $12.

At the death of each member his beneficiaries are paid $1,000.

We shall be glad to learn that Mr. Copeland has been the means of adding many new members to the already long list.

Brotherhood of Telegraphers.

The National Convention of Telegraphers has formed an organization to be known as the Brotherhood of Telegraphers, composed of divisions to be known as councils. Every person over the age of 14 engaged in any department of the business of telegraphy is eligible to membership. The eight-hour system for day work and seven for night work was agreed upon. As many week days as are contained in a month are to constitute a month's work. The rate of compensation for extra work to be mutually agreed upon by the local councils and the employers.

The Bell Telephone Company of Canada.

This company, the rights of which have been extensively infringed upon, owing to doubts as to the powers conferred upon it by Parliament, is now seeking amendments: "Section 4, provides that the said company shall have power to extend its telegraph and telephone lines from any one to any other of the several Provinces in the Dominion of Canada, and from any point in Canada to any point in the United States of America.—*The Shareholder.*

The pooling arrangement recently made by the four transatlantic cable companies has resulted in negotiations between the Western Union Telegraph Company and those companies for new working contracts. The Western Union has a contract with the Anglo-American Cable, and by the absorption of the Atlantic and Pacific, and the American Union, it acquired control of the contracts which those companies had with the Direct and the French companies respectively. All of these contracts are to be abrogated by common consent, and new contracts made with the three old companies and with the American Cable Company on terms that will conform to the pooling arrangement of the cable companies. The new contracts were approved by the officers of the Western Union, American Cable, and the counsel of the foreign cable companies to-day, and were telegraphed to the executive officers of the latter at once. As all parties in interest have been working in accord upon the matter, it is expected that the contracts will be formally executed within a day or two. Until then the details cannot be made public. As soon as the contracts are executed, the Western Union will lease the cables of the American Cable Company and operate them under its own title, which will, it is said, be practically an extension of the Western Union to London. To this end the Western Union leased to-day offices in Throgmorton street, near the London Stock Exchange, and branch offices in Regent street. The officers of the company said to-day that its stock would doubtless be listed on the London Stock Exchange within the next sixty days, and that, whether listed or not, the company would establish an office there for transfers and the payment of dividends. It is learned from trustworthy sources that the opening of such an office is in accordance with the plans of a syndicate, of which J S. Morgan & Co. of London are members, for placing the stock abroad.

The number of municipal services in Paris in which telegraphs or telephones are used is so large that the civic authorities have decided to establish a telegraphic examination for their employés.

A powerful dynamo machine, with twelve magnets, designed for a station at Charing Cross, London, and having an illuminating capacity equal to 537,600 candles, cost for construction $6,000.

The Western Union Telegraph Company has leased two offices in Liverpool for the use of the American Cable Company.

American District Telegraph.

The directors of the American District Telegraph Company took preliminary steps on the 21st inst. to carry out the working agreement lately made with the Western Union Telegraph Company and other assenting corporations. Gen. Thomas T. Eckert was elected president, in place of W. F. Drake, resigned. W. F. Drake was appointed general manager, and the following directors were elected: Jay Gould, T. T. Eckert, D. H. Bates, T. C. Platt, W. F. Drake, A. B. Johnson, F. B. Wallace, J. A. Patterson, Chauncey M. Depew, A. B. Cornell and E. N. Andrews.

Touching telegraphic competition with the Western Union system, we have reason to believe that the Mutual Union, the Baltimore and Ohio Telegraph, and one or more small competitors will all be drawn off in the course of a week or two. The most important of these—the Mutual Union Company—we suppose have already informally agreed to transfer their wires to the Western Union. The line of telegraph promoted, and indeed owned, between New York and Chicago, by the Baltimore and Ohio road, will also be transferred as part of the consideration for settling with Mr. Gould and his associates for a majority of the Central New Jersey Board of Directors, whereby the Baltimore and Ohio and Philadelphia and Reading reach the bay of New York, against further opposition.—*Commercial Advertiser.*

According to the *Annales de l'Extreme Orient*, at the commencement of the year there were in Japan 3,929 miles of telegraph line with 9,345 miles of wire. The telegrams sent during the year numbered 1,272,756, of which about 96 per cent. were in Japanese, while there were 22,695 international messages. A school of telegraphy has been founded in the capital, the pupils receiving a practical knowledge of English and French. During the year this institution sent 227 young men out to the various telegraph offices. The average cost of sending twenty words in Japanese for a distance of sixty miles is about three *sen*, or one penny, taking as a basis of calculation the line from Tokio to Nagaski. The average of shorter distances is much greater, being about seven *sen* from Yokohama to Tokio, a distance of only twenty miles. There were 112 offices open to the public, and 70 attached to departments of State, the police, &c.; 53 remained open night and day; 848 Morse instruments were in use at the end of the year, and 29 Bell telephones.

"Continue, I beg of you," said one of the oldest subscribers of *Progress*, Philadelphia, "in your demands for the extension of the electric light throughout the city. It is the horror of evil-doers and the street ruffians. It is far better than an armed police. First of all we want the illumination in the squares. The improvement in Washington Square has already driven away the bummers whose headquarters it was. Now let us brightly light it and Independence Square at night, and make these the attractive *plazas* at all times they are so easily capable of being made. Then, when the railings are down from around the other city parks, give them the electric light also."

The Mutual Union Case again Adjourned.

Pursuant to adjournment the case of Pliny H. Babbitt against the Mutual Union Telegraph Company and others was again before Judge Truax in the Special Term of the Superior Court, but again adjourned until April first.

The New Telephone and Telegraph Company—Another Important Enterprise Starts from Cedar Rapids, Iowa.

The initial meeting of a new telephone company, known as the Iowa Telephone and Telegraph Company, with a capital of $250,000, took place in this city yesterday, resulting in the election of the following board of directors for the ensuing year: George B. Engle, jr., D. H. Ogden, J. J. Snouffer, R. D. Stephens, N. Fr. Hansen, Charles H. Clark and F. E. Engle.

At a meeting of the board, held after the adjournment of the stockholders meeting, the following gentlemen were elected officers of the company: George B. Engle, jr., president; J.J. Snouffer, vice-president; R. D. Stephens, treasurer; N. Fr. Hansen, Secretary and D. H. Ogden, general manager.

This company succeeds to the business of the Hawkeye Telephone Company, an organization that has been building telephone exchange systems in a large number of important towns in the State during the past year, and owns the American Bell Telephone Company license for the supplying of private line telephones for nearly the entire State.

With ample capital and with valuable franchises and territory possessed by this company, the success of the enterprise would seem to be assured.—*Daily Republican.*

The Cable Agreement Signed.

The agreement for the pooling of the business of the Atlantic cable companies having been proposed in this city and telegraphed to London was to-day formally approved by the manag rs of the English companies. The signatures will be offered and the agreement fully ratified next Monday. The terms of the pooling arrangement are based upon the receipts of the various companies. No decision has been reached as to whether the rates for the transmission of messages will be increased or not. The compact between the cable companies will necessitate the American Union and Western Union Telegraph Companies for business forwarded from inland points in the United States via the cables to Europe. March 25th.

Mechanical Invention and Civilization.

Mr. Frederic Harrison delivered a lecture at the London Institution on "The Real Value of Mechanical Invention to Civilization," of which the following is a summary:

"No century, he remarked, had ever been so bepraised as our own for its marvelous mechanical inventions. But, after all, our century was undeniably the heir of great and worthy predecessors. Was it in point of civilization a head and shoulders taller than the rest? Before this question could be answered, civilization must be adequately defined - a task too large for that occasion. But it was at least certain that the triumphs of invention were not of the essence of civilization, but belonged to its externals only; so that, heartily as we might hail material progress, we could not regard mechanical improvements as of altogether incalculable worth. For four thousand years and more men could travel only as fast as their legs could carry them; now they were carried by rail. In our days news was flashed in a minute, which not so long ago would have taken a year to arrive. Ten thousand shirts were now woven by steam in as short a time as the fingers took to make one. Gas and electricity had superseded tallow and oil. But these and other like achievements of inventions were merely signs of material, physical, visible and external life. Were we so much the happier for these things? The answer must be 'No.' This age enjoyed a thousand times as many advantages as its forerunners. But, until we used those advantages aright, we should be none the better for them, and for this we must look to the future. The nineteenth century was not an age for complete achievement, but of expectation and hope. A detailed comparison was instituted between this and former centuries in science, philosophy and the arts. In summing up the result, Mr. Harrison reminded the audience that we are apt to be bewildered by the vast multiplication of our materials and our books, and betake ourselves to specialization. This, too often, ended in trivialities. As no man could do everything, each inquirer staked off his little plot from the vast field, warning off all others. Hence, we had naturalists who knew nothing of nature, and monographs on the spot on the wings of a butterfly found on a particular island. Our millions of books and our billions of facts could not help us, and we were shamed by the noble life revealed in 'Plato's Dialogues' and the 'Odyssey.' The moral sores of our age were probed, and, though it might be urged that there could be no casual connection between these and our mechanical progress, yet there was undeniably an historical connection. Mr Harrison felt no sympathy with Carlyle and Ruskin in their indiscriminate depreciation of mechanical inventions, but the worth of such things must not be exaggerated. What was wanted was to turn them to the best account as means of civilization, though they were not civilization itself."

The New American Cable.

CANSO, N. S., March 23.—Advices received from the cable steamer Farady say: "At 11.30 o'clock A.M., New York time, to-day, just completed the laying of the American shore end of the second of the transatlantic cables of the American Telegraph and Cable Company."

Bands of music are forbidden to play on most of the large iron bridges of the world. This is due to the well-known phenomenon that a constant succession of sound waves, especially such as come from the playing of a good band, will excite the wire vibrations. At first these vibrations are very slight, but they increase as the sound waves continue to come.

It is a popular error to suppose that ivy growing on the walls of a house makes it damp. The attachment of ivy to walls, so far from injuring them and causing dampness, is an advantage. If the walls are dry when planted, ivy will keep them so. If damp, as the plant overspreads their surface the dampness will disappear. Where dampness prevails ivy sucks out the moisture, and its thick foliage will prevent the access of rain to the structure; and thus it is not only a remover, but a preventive, of dampness. The only danger attending the planting of ivy on buildings is where fissures occur in the walls, in which case the shoots and roots will enter, and, if left undisturbed, their growth will soon begin to tell upon the building, and will, by increase of growth, push against the sides of the opening, thereby enlarging it, and eventually so weaken the wall as to cause it to fall. Where the wall is sound there is no such danger, for the plant does not make fissures, although quick to discover them.

The novel and interesting process announced some time since, in France, by which the wool on sheepskins may be transformed into velvet, is likely to prove of industrial importance. Up to the present time sheepskins, tanned with the wool on, have only been used for mats, linings of coats, &c., and the wool, not having been subjected to any preparation, is always matted or curled. Observing that the innumerable fibers are naturally disposed in the most regular and perfect order, peculiarly fit for velveting, an ingenious chemist conceived the idea of cleansing the skin and wool of all impurities, and of so preparing and dressing them that the hairs would be well preserved and not entangled one with the other—the occurrence of the latter contingency being, of course, fatal to the success of the operation. After long and continuous experiments, success has been achieved, the article produced being alike beautiful and serviceable, and destined, it is thought, to become a permanent and important article of manufacture

M. Salignac, one of the most active electricians of Paris, has discovered a new regulator which will be one of the curiosities of the next *grande soiree* given at the Observatoire on the 13th inst. Each of the two carbons is supplied with a parallel rod of glass, to which it is attached in a solid manner. These two rods, being placed horizontally, are pushed by a spring, and the spark is lighted between them. But between the two glass rods there is a glass stopper which is warmed by the light in such proportion that the rods yield gradually to the pressure of the springs and the carbons can approach each other, as is required for the constancy of illumination. Our correspondent witnessed preliminary experiments, which he states have been a wonderful success.

There are so many ways by which courtesy and politeness can be beneficially applied in business that we are at a loss to perceive why more of these nice ingredients are not infused into our every-day life and associations. Nothing insures a ready and complete answer more than a civil, polite inquiry, graced with as little peremptoriness as possible, and without being slavishly obsequious, there is no characteristic so becoming to the merchant's assistant as are the readiness to do his entire duty promptly and faithfully.

A Meteor that Made Mountains Tremble.

From the Helena Independent.

An enormous meteoric stone fell last night at 10 o'clock, southeast of Fort As-inaboine, Montana, lighting up the surrounding country with the glare. The time which elapsed between its striking the earth and the report reaching here was nearly five minutes. The shock was like the report of a cannon, and the earth was shaken. Taking into consideration the fact that sound travels 1,120 feet in a second, it is estimated that the meteorite must have fallen fully fifty miles distant from Assinaboine.

The people of the country at large have been regarding with some satisfaction the fact that Wall street has found out what was known everywhere else—that this is a great, prosperous and growing country.

Well-informed American visitors to England say that the poems of Longfellow are the favorites of all classes of the people, and that ten copies of his works can be found in English homes to every copy of Tennyson.

Mr. Swan, the inventor of the English rival of Edison's lamps, recently exhibited a two-candle power lamp detached from any wire and portable. It could be kept lighted for six hours by a small Faure secondary battery not exceeding ten pounds in weight.

In experiments with the electric light in night military operations, made at Chatham, England, bodies of men were readily discovered at a distance of more than one thousand yards.

The Safest Car.

It is very well known that the car nearest the engine is exposed to the least dust, and that the rear car of a train is generally safer than the front car. The safest is probably the last car but one in a train of more than two cars; that is, there are fewer chances of accidents to this than any other. If it is a way train of moderate speed, or any train standing still, a collision is possible from another train in the rear, in which the last car receives the first shock. Again, the engine and front cars of a train will run over a broken rail, or a cow, or stone without detriment, while the last car, having nothing to draw it into the line of the train, is free to leave the track. Next to the forward car, the rear car is probably the most unsafe in a train. The safest seat, says the *Railroad Journal*, is probably near the center of the last car but one.

The Pacific Railroads.

A report from the Secretary of the Interior, in answer to a resolution of the House of Representatives, shows the net earnings for a series of years of five Pacific railroads. So much valuable information is conveyed by these figures that we present the exhibit in condensed form:

	Net Earnings.
Central Pacific from December, 1869, to December, 1881	$64,557,717 75
Union Pacific from November, 1869, to December, 1881	79,685,454 19
Central branch of Union Pacific from October, 1868, to December, 1881	1,451,191 90
Kansas Pacific from November, 1868, to December, 1879	11,031,276 04
Sioux City and Pacific from September, 1868, to December, 1881	1,191,992 64
Total	$157,917,632 52

The subsidies in land grants and in money furnished a fund more than sufficient to build these roads. No such liberality was ever before exhibited by any Government. Under a decision of the Supreme Court, the Treasury has paid the interest on its own bonds, issued to construct these roads, and will continue to pay it until the bonds mature.

Yet with all these enormous benefits the corporations have fought the government as a bitter enemy, and have refused to pay even the small percentage which the charters required. Now they are planning to overthrow the THURMAN act.

The net earnings, so called, do not represent by any means the entire profits of the roads. Many of the figures are of questionable veracity. The Southern Pacific is alleged to have been built entirely from the profits of the Central Pacific, both of them being controlled by half a dozen individuals.

When it is remembered that the capital for the Pacific roads came out of the public treasury, the stupendous value of the franchises may be estimated. And still the corporations are not happy. They have enlisted for another long war against the government, which, partly in ignorance and partly through corruption, made these enormous grants.

Florida and its Groves.

A Florida correspondent writes to the Savannah *News* that the present profusion of blooms upon the orange trees is unexampled, and, if fruit sets on a fifth of the flowers, the limbs will give way beneath the weight before the summer is ended. The promise now is for an extraordinary yield. The atmosphere is loaded with their perfume. The largest orange grove in the State is that of Major George H. Norris, at Spring Garden His grove contains 11,000 trees, which yielded half a million of oranges. Mr. De Bary's trees at Enterprise will yield about 250,000 oranges this year. He is the American agent for Mumm's champagne, and has spent $250,000 on h s house and grounds.

To Build the Underground Road.

THE CONSTRUCTION CONTRACT ENTERED INTO BY ORIGEN VANDENBURGH.

By the terms of an agreement entered into by Origen Vandenburgh and the New York Underground Railway Company, of which Gen. McClellan is President, Mr. Vandenburgh has surrendered to the company the franchise owned by him of the New York Central Underground Railway Company, and his controlling interest in the Broadway Connecting Underground Railroad Company. The consideration is $3,000,000 of the $10,000,000 capital stock of the new company, Mr. Vandenburgh also contracts to construct the proposed railway and fully equip it, his functions to be the same as that of a construction company. The road is to run from the Battery to Madison Square, where it diverges to the left and right, one branch to run to Forty-fifth street and Madison avenue, and the other to Broadway and Fifty-ninth street. The entire length is about 6½ miles.

Mr. Vandenburgh's remuneration is to be $2,000,000 worth of the company's bonds and $1,000,000 of the capital stock for each mile completed and equipped. To secure the bonds, he and the Farmers' Loan and Trust Company are made trustees. The agreement provides for a change of route—if the route to pass under Broadway is secured—from the route now owned by these corporations, which is east of Broadway, and also provides for possible connections with the Grand Central Depot. Two hundred thousand dollars is to be advanced by the corporation to begin the work. The work is to be begun as soon as possible. Vandenburgh is made responsible for all claims for damages by property owners and others, and for the consideration named is also to acquire lands necessary for stations. The specifications call for stations at the Battery, Wall street, City Hall, Union and Madison squares, and the upper terminus of the road.

NEW ELECTRIC ACCUMULATORS.—It may interest those who have been looking forward to a practical application of electric lighting to private houses, and to a possibly general use of the enormous forces which, by the aid of electricity, may be placed under ready command, to know that great improvements have recently been made in electrical storage or accumulating batteries. It is stated that these improved batteries are of five times the durability and possess 2¼ times the storage capacity of those known as the Faure accumulators, and that they are of such a practical construction that they can be readily renovated when necessary without waste of material, while their first cost is less than that of the Faure. Each cell, of about 43 100 of a cubic foot in size, and consisting of about 60 lbs. of metallic materials, is capable of containing 400 amperes, and of delivering during eight hours a current of 50. Each cell, in fact, represents over one horse power of energy for one hour. Public demonstration will be made very shortly; and it is stated that probably within a few weeks, at the Crystal Palace Electrical Exhibition, 200 incandescent lamps will be shown running upon one set of 35 large cells of this new construction.—*Times.*

New Books.

Just published, The Electric Light in Its Practical Application. By Paget Higgs, LL.D., D. Sc., Telford Prizeman and Associate Member of the Institution of Civil Engineers. Also, recently published, Electric Transmission of Power: Its Present Position and Advantages by the same author. New York: E. & F. N. Spon, 446 Broome Street.

An Electrical Directory.

The Electrical Directory and Advertiser, which is, indeed, the "Electrician's *Vade Mecum*," has just been published by Prof. J. A. Berly, 16 New Bridge street, London, E. C., England, is now before us. It is, indeed, complete, and supplies a want which has long existed, and which fund of useful information can be found nowhere else, and will be found invaluable to those interested in such matters. We wish the same work might be published here. It contains a complete record of all the industries directly or indirectly connected with electricity and magnetism, as well as the names and addresses of manufacturers, etc., etc. A few of the notices of the London papers concerning it we give below:

SOME PRESS OPINIONS.

The remarkable progress made of late years in the practical development of electrical science, which culminated in the magnificent electrical display in Paris, and the new industries brought into existence by that development, have at length rendered an Electrical Directory a necessity to the vast number of persons directly and indirectly engaged or interested in the various electrical industries. In view of this, Mr. J. A. Berly, of 16 New Bridge street, E. C., whose name is well known in connection with electric lighting, is preparing for publication at the opening of the new year the first issue of "The Electrical Directory and Advertiser of England." It is to form a complete record of all the industries directly and indirectly connected with electricity and magnetism, and the names and addresses of manufacturers. It will contain an historical account of the development of electric lighting, together with a number of tables and formulæ useful to electricians, and is calculated to meet a now palpable want.—*The Times, 18th November* 1881.

Mr. J. A. Berly, C. E., who is well known in connection with the development of electric lighting, is preparing for publication the first issue of "The Electrical Directory and Advertiser of England, 'the Electrician's *Vade Mecum.*'" It is to contain a complete record of all the industries directly or indirectly connected with electricity and magnetism, together with the names and addresses of manufacturers, as well as their advertisements. It will open with an historical account of the development of electric lighting, and will contain tables and formulæ useful for electricians. The remarkable progress made of late years in the development of electrical science culminating in the magnificent display at the Paris International Electrical Exhibition, has rendered such a work of reference a necessity; and this being the case, we may safely predict for it a successful career. It will be published with the new year by Mr Berly, at his offices, 16 New Bridge street, London, E. C.—*Iron, 18th November*, 1881.

We learn that Mr. J. A. Berly, of 16 New Bridge street, London, the well known electrical engineer, is preparing for issue in January next an Electrical Directory which shall include, amongst other matters, the names and addresses of engineers and manufacturers connected directly or indirectly with electricity and magnetism. When it is considered how many and varied are the industries included within these limits, it will be seen that the work will be one of considerable importance, while, the great development in practical electrical science during the last few years has rendered the publication of such a directory almost a necessity. In addition to the directory proper, the book will contain a review of progress in electricity and magnetism, a collection of rules and formulæ, and other matter which will make it useful as a work of reference, in addition to the main purpose it is intended to serve. That Mr. Berly has undertaken this work is a sufficient guarantee that it will be thoroughly carried out.—*Engineering, 18th November*, 1881.

Miscellaneous Notes and Facts.

A Dimple.

A valley born in sunshine with the blush of early morn;
A vale where pleasure nestles in nature's softest down;
Paradise by a smile created;
An Eden lost by a frown.
—*Henry Bacon, in Harper's.*

ROSE CULTURE.—The Kezanlik Valley, in Roumania, is entirely given up to the cultivation of roses. The essence is sold wholesale in Paris from $150 to $200 per pound, while it is retailed at $500 or more per pound.

A lady writer finds fault with the manners of the King of Sweden, because his majesty scratched his royal head with a fork at dinner. Some people are entirely too fastidious. Would the lady have had his majesty scratch his head with the leg of a chair? *Somerville Journal.*

A county officer on a salary of $800 per year purchased two horses for $600; a carriage for $400; a set of silver for $200; four silk dresses for his wife at $60 each, and played poker to the tune of $180. How much did he save out of his year's salary, and what is the county going to do about it?

The Standard Oil Company started with a capital of $1,000,000. Its actual capital is now estimated at $35,000,000, and in eight years it has paid $10,000,000 in dividends. The influence of this gigantic monopoly is something unprecedented in the history of this country,

Prayer is the local, and the sermon the editorial of the Sabbath morning service.—*Whitehall Times.* And the music the advertisements.—*Steubenville Herald.* And the collection, brethren, represent delinquents paying up.—*Salem Sunbeam.* And the congregation, Rip Van Winkle.—*Pendulum.*

London has nearly 6,000 hansom cabs; about the ugliest looking machines of locomotion that can be conceived.

The man who doesn't talk opera now in the original is a poor stick. If he cannot rave about "Ah, non jingle mea dollore;" "Io busto mea cor," he's no good.

Cardinal Newman says that a gentleman is one who never inflicts pain; then no dentist can be a gentleman.—*Buffalo Courier.*

The Unseen Hand is the title of a new book. Probably the other man didn't have anything better than a pair of treys, and didn't dare to call.—*Boston Post.*

It is said that when a Chicago man saw Niagara he shed tears. "Blame it," he remarked, "I ain't enough of a liar to describe it and make it out any bigger than it is!"

The total taxes of the French people are £107,303,975, with a population of 36,905,788, or about $15 tax per capita. The Russians pay £60,362,731, there being 72,692,000 people among whom to divide this, making the tax of each Russian $4.

The number of savings banks in the State is 127, with aggregated resources of $143,047,414. The amount of money deposited in these banks on the first day of the year was $387,832,893, being an increase over the deposits of 1880 of $34,203,236.

The gross earnings of the Pennsylvania Railroad Company for 1881 were $75,182,973, with a net revenue of $28,939,695 from its various lines.

During the past decade the population of Rome has increased 55,983, that of Naples 45,680, that of Turin 40,188, of Milan 59,554, of Palermo 25,557, and that of Florence only 3,481.

Some idea of the growing value of Paris house property can be gathered from the fact that the Prince de Bearn has just sold two houses (Nos. 169 and 171 Boulevard Haussman) to an insurance company for the sum of $500,000.

No well-conducted newspaper office is said to be properly furnished without a few cobwebs, Cobwebs are a badge of age and chronic respectability.

Canadian revenues have increased until from having a deficiency of $200,000 in 1879, the treasury had a surplus of over $400,000 for the twelve months ending last July.

The annual dairy product of the U. S. is estimated at between $400,000,000 and $500,000,000, being greater than either that of the wheat or corn crop and exceeding that of cotton and wool combined.

A Dusseldorf paper states that a train lighted by electricity was recently run between Frankfort-on-the-Maine and Hanau, with success. There was one dynamo machine on the engine, and the motion of the carriage-axles was also used.

"I threw this off in ten minutes," softly said the poet, placing a manuscript on the editorial table. The editor said that when it came to speed no long-haired poet should distance him; and he threw it off in less than ten seconds—off the table into the waste basket.

California shows a decrease in gold the past year, compared with the previous year, amounting to $579,069, and an increase in silver of $323,582. Utah shows an increase in the precious metals of $860,335. Colorado shows an increase of $1,672,171, and Arizona $3,726,295 over the reports of the last year.

"What are you going to make of your boy Bill?" asked one Austin parent of another. "I think Bill will be a great sculptor," was the reply. "Has he any talent that way?" "I should say so—he chisels all the other boys out of their marbles."

Said the night watchman, when about dusk he was invited to drink a cup of coffee, "No, thank you; coffee keeps me awake all night." Then he saw his blunder, looked very embarrassed, and tried to explain it. But it was no use.

Luther said, "If a man is not handsome at twenty, strong at thirty, learned at forty and rich at fifty, he will never be handsome, strong, learned or rich in this wor'd." Luther no doubt struck the bull's eye as far as beauty, strength and learning are concerned, but he died before an office-holder had acquired the art of saving $25,000 a year out of a salary of $3,000; hence his remark about riches don't fit now.—Norristown *Herald.*

You ought not to ask any favors from fortune; all that you have a right to demand is that you shall, like a horse that is willing to do his share, but not willing to pull the whole load, be put even on the whiffletrees.

According to Prof. Young, the total quantity of light emitted by the sun is equal to 6,300,000,000,000,000,000,000,000,000,000 candles. Such an array of figures, however, seems meaningless, so faint is our conception of the number.

Professor Cheyne is now going to try and reach the north pole in a balloon, but he'd better start before they put up many more telegraph, telephone and electric light wires, or he will have to navigate his balloon by means of a hand sled.

The practicable use of compressed air is found to be sufficient and an excellent motive power on some of the English tramways.

Types of Brakemen.

"How many types of the many-sided brakemen we have traveled with," said the jester, musing over five years' platform travel. "There is the plural one, you know, who always doubles up on the names of the stations, and calls out, 'Clevelands! Clevelands! Change cars for Hudsons, Ravennas, and Akrons! This car's for Buffaloes!"

"And the jovial one," said the fat passenger, "the jolly brakeman who is always happy; who, when we run into a penitentiary town, always shouts, 'Moyamensing! Change suits! Seven years for refreshments!' If you tell him the fire has gone out, he wants to know who left the door open. The crosser the passengers are, the merrier he is, and it would be a thing without parallel to see him mad."

"And the dismal brakeman," said the cross passenger, "who puts wet wood in the stove and leaves the door open, and spills grease on you when he lights the candles, and if you ask him when we get there, he sighs and says we may never get there. He points out of a window at a whistling post and says, 'There's where number six ran off and killed Billy Bly last week.' And when we cross a ravine he says, 'This is the same kind of a bridge the Ashtabula disaster happened on.' And he points to a heart-broken man two seats ahead of you and tells you, 'His wife is dead. We've got her in the baggage car.' And then in a determined effort to increase your gloom, if possible, he adds, 'Only one he had."

"And the cautious brakeman," said the sad passenger, "the slow-spoken man who always looks at his watch very carefully before he will tell you at what time the train is due at the terminus, and looks out the window to get his landmark before he tells you where you stop for dinner."

"And the irascible duffer," said the man on the wood-box, "who roars 'Naw!' when you ask him if this is a mail train, and bangs the door against your elbow every time he comes in, and tells a bewildered woman who wants to know how she can get to Neblet's Siding that night, 'that she can get off at the tank when we stop at Brewster's, run down on 12 and catch 22 coming back on 15's time, and that's the only train that stops there.' And he gets so filled with wrath that he has to get out on the platform and swear it off at the little snow-birds on the telegraph wires. I know him," the man on the wood-box said, as he rubbed his elbow with pathetic emphasis.

"And the liar," said the woman who talks bass, "who tells you the train makes close connections with other trains at places that are not junctions, who tells he'll build a fire in that car after they leave the next station, and you find that the station is the end of his run; who says he'll help you out with your bundles and then runs back into the parlor car to talk with the engineer's daughter, and who always tells you he has no key when you ask him to turn a seat for you."—*Burlington Hawkeye.*

Our next edition will be 5,500 copies.

NEW PATENTS—1882.

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING MARCH 7TH, 1882.

254,546. Regulator for Electric Lights. J. H. Guest, Brooklyn, N. Y. Filed August 30, 1880. (Model.)

254,597. Electric Meter. Charles V. Boys, Wing, near Oakham, County of Rutland, England. Filed Dec. 8, 1881. (No model.) Patented in England Oct 13, 1881, and in France Nov. 11, 1881.

254,676. Galvanic Battery. Alfred Michaud, Paris, France. Filed Sept. 3, 1881. (No model.) Patented in France April 12, 1880, and July 11, 1881, and in England Aug. 26, 1881.

254,610. Insulator for Telegraph Wires. William H. Capewell, Philadelphia, Pa. Filed June 22, 1881. (No model.)

254,641. Electric Lamp. John H. Guest, Brooklyn, N. Y. Filed Nov. 19, 1881. (No model.)

254,780. Electric Incandescent Lamp. Edwin A. Scribner, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y. Filed Jan. 26, 1882. (No model.)

254,762. Electric Lamp Regulator. Benjamin B. Brewer and Addison G. Waterhouse, Sacramento, Cal., assignors of one-fourth to W. S. Johnston, same place, and Richard W. Tully, Stockton, Cal. Filed Oct. 11, 1880. (Model.)

254,672. Carbon for Electric Lamps. Hiram S. Maxim, Brooklyn, assignor to the United States Electric Lighting Company, New York, N. Y. Filed April 25, 1881. (No specimens.)

254,764. Reostat for Electric Lamps. Patrick E. Fox, New York, New York. Filed July 7, 1881. (Model.)

254,523. Electric-Light Reflector and its Support. William Wheeler, Concord, Mass., assignor to the Wheeler Reflector Company, of Boston, Mass. Filed Dec. 8, 1881. (No model.)

254,522. Supporter for Electric-Light Reflectors. William Wheeler, Concord, Mass., assignor to the Wheeler Reflector Company, of Boston, Mass. Filed Dec. 8, 1881. (No model.)

254,611. Circuit for Fire-Alarm Telegraphs. Robert Carter, New York, N. Y. Filed Nov. 21, 1881. (No model.)

254,573. Individual Signaling Apparatus for Telephone Lines. Henry D. Sisson, Mill River, Mass. Filed March 28, 1881. (No model.)

254,642. Telephonic Receiving Instrument. William B. Hale, Washington, D. C., assignor to the United States Telephone Manufacturing Company, New York, N. Y. Filed July 26, 1881. (No model.)

254,699. Electric Burglar Alarm. Henry C. Roome, Jersey City, N. J. Filed March 7, 1881. (No model.)

254,743. Electro Magnet. Addison G. Waterhouse, New York, N. Y., assignor to the United States Electric Lighting Company, same place. Filed Aug. 1, 1881. (No model.)

FOR WEEK ENDING MARCH 14TH, 1882.

254 948. Distribution of Energy by Electricity. St. George Lane Fox, London, England. Filed Jan. 13, 1881. (No model.) Patented in England Oct. 9, 1878, Oct. 12, 1878, and Nov. 14, 1878; in France, Oct. 23, 1878; and in Belgium, Oct. 30, 1878.

254,912 Electric Lamp. Virgil W. Blanchard, New York, N. Y. Filed Feb. 10, 1881 (No model.)

255,056. Electrical Switch Board. Theodore N. Vail, Boston, Mass. Filed Dec. 14, 1881 (No model.)

254,977. Automatic Telegraphic Transmitter. E. L. Hutchinson, New York, N. Y. Filed May 18, 1881. (Model.)

255,031. Telephone Exchange Circuit and Apparatus. John I. Sabin, San Francisco, Cal. Filed Aug. 6, 1881. (No model.)

A printed copy of the specification and drawing of any patent to the annexed list, also of any patent ssued since 1865, will be furnished by any of the patent solicitors whose advertisement appears on the next page. In ordering please state the number and date of the patent desired.

New Patents—Great Britain—February and March, 1882.

856. "Generation, storage, distribution, regulation and utilization of electricity, and apparatus or means therefor." J. S. Williams. Dated Feb. 22

866. "Machinery for the manufacture of cables for telegraphic or other purposes." J. C. Mewburn. (Communicated by La Société Alamagny et Oriel.) Dated Feb. 22.

869. "Dynamo-electric machines and apparatus connected therewith for lighting by electricity, and other purposes." C. E. Spagnoletti. Dated Feb. 22.

872. "Electrodes or contacts for telegraphic or other electrical instruments." F. Des Vœux. (Communicated by G. Cumming and C. M. Brinkerhoff.) Dated Feb. 23.

879. "An improved annunciator or indicator drop for telephone exchanges or the like." M. Volk. Dated Feb. 23.

880. "Electrical signaling apparatus, especially intended to communicate the outbreak of fire." C. Spratt. Dated Feb. 23.

898. "Electric arc lamps." J. Brockie. Dated Feb. 24.

902. "Manufacture of asbestos fabrics (for insulated conductors of electricity)." H. J. Haddan. (Communicated by T. Trivier.) Complete. Dated Feb. 24.

905. "Secondary batteries." J. W. Swan. Dated Feb. 24.

922. "Apparatus for transmitting and receiving audible signals by means of electricity." A. F. St. George. Dated Feb. 25.

931. "Dynamo-electric machines." A. M. Clark. (Communicated by H. B. Sheridan.) Complete. Dated Feb. 25.

933. "Compass correctors." J. J. Wilson. Dated Feb. 25.

941. "Improved arrangement of application for electrically controlling and regulating the speed of engines employed for driving dynamo-electric machines." J. Richardson. Dated Feb. 27.

943. "Improved machinery for obtaining continuous or alternating currents of electricity." H E. Newton. (Communicated by A. J. Gravier.) Dated Feb. 27.

958. "Apparatus for cutting and reeling paper for telegraphic and other purposes." W. W. Colley. Dated Feb. 27.

985. "Improvements in the construction of apparatus for lighting gas by electricity, parts of which improvements are also applicable to other electrical appliances." C. L. Clarke and J. Leigh. Dated March 1.

986. "Dynamo-electric machines." W. H. Akester and T. B. Barnes. Dated March 1.

1002. "Electric rotary or revolving hair brush. H. Lersner. Dated March 2.

1017. "Insulating apparatus for overhead telegraph lines or other wires for carrying electric currents." J S. Lewis. Dated March 3.

1020. "Apparatus for transmitting and receiving sound" J. Rapieff. Dated March 3.

1023. "Means for indicating and regulating the current of electrical generators for supplying electric lights and other purposes" T. J. Handford. (Communicated by T. A. Edison.) Dated March 3.

1024. "Construction and working of junction or switch apparatus, specially applicable for use in telegraph or telephone exchanges or stations, or for other similar or equivalent uses." W. E. Irish. Dated March 3.

1027. "Incandescent electric lamps." F. Wright and M. W. W. Mackie. Dated March 3.

1031. "Vacuum pumps for exhausting bulbs of electric lamps or other vessels." F. Wright and M. W. W. Mackie. Dated March 3.

1034. "Galvanic chains." C. D. Abel. (Communicated by A. L. A. Kraehmer.) Dated March 3

1036. "Manufacture of carbons suitable for electrical purposes, and apparatus connected therewith." H. Liepmann and P. S Looker. Dated March 3.

1044. "Telephone transmitters." R. and M. Theiler. Dated March 4.

1054. "Telephonic apparatus." N. C. Cherrill. Dated March 4.

1079. "Improvements in the construction and manufacture of incandescent electric lamps, and in the apparatus used therein." W. Crookes. Dated March 6.

1085. "Electro-magnets, and armatures therefor, for electro-mechanical, telegraphic and other purposes." W. P. Thompson. (Communicated by G. Smith.) Dated March 7.

1094. "Sockets or holders for electric lamps." E. H. Johnson. Dated March 7.

A New and Important Amendment to the Patent Laws.

[H. R. 4949. In the house of representatives. March 6, 1882. Read twice, referred to the Committee on Patents, and ordered to be printed.]

Mr. Morgan R. Wise introduced the following bill: "A Bill to amend the patent laws."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That to prevent the perpetration of fraud upon innocent purchasers of patent rights granted by the United States, it shall be the duty of all persons, before making the purchase of any such rights, or alleged rights, to require the patentee, or any person offering the right for sale, to procure and exhibit, for the examination of the intended purchaser or any person he may select, the original patent, or a copy of the specification and claim or claims, together with the drawings where they form a part of the specification and patent, each issued by the United States Patent Office, wherein is fully described in the specification, and in the claim or claims of which is particularly pointed out, just what was allowed, granted, and included in such patent, and no more; and if any person shall exhibit or use as a means for effecting any such sale any such specification, claim or claims, or drawing purporting or represented to have been issued by the United States Patent Office, and which was not issued from and by authority of said office, or shall so exhibit or use any patent or copy of a specification, claim or drawing issued by said office, but which has afterwards been changed or altered in language or drawing with evident intent to thereby deceive, shall upon conviction thereof, be deemed guilty of false pretense or forgery, according to the nature of the offense, and shall be liable to a fine of not exceeding one thousand dollars, or to imprisonment not exceeding three years, or both at the discretion of the court.

SEC. 2. That whosoever sells or conveys any interest in any patent right, or grants any license thereunder, knowing that said interest or privilege so purporting to be granted or conveyed has been previously conveyed, in whole or in part, to others, without informing the grantee or grantees of the existence and true nature of such incumbrance or prior right, so far as he has actual knowledge thereof, before receiving any payment therefor, by note or otherwise, shall, upon conviction thereof, be punished by imprisonment not exceeding three years, or by fine not exceeding one

thousand dollars, or both, at the discretion of the court.

SEC. 3. That section forty-eight hundred and eighty-five of the Revised Statutes of the United States be amended so as to read as follows:

Every patent shall bear date as of a day not later than seven months after the time at which it was allowed and notice thereof was sent to the applicant or his agent; and if the final fee is not paid within six months after the date of such notice of allowance, the patent shall be forfeited and withheld."

SEC. 4. That section forty-eight hundred and ninety-five of the Revised Statutes of the United States be amended so as to read as follows:

"Patents may be granted and issued to the assignee of the inventor or discoverer, and they may be reissued to the owner or owners of the entire interest in the patent; but the assignment must first be entered of record in the Patent Office. And in all cases of an application by an assignee for the issue of an original patent, the specification shall be signed and sworn to by the inventor or discover, if living; and in all cases of an application by an assignee for a reissue of any patent, the application may be made and the corrected specification sworn to and signed by the inventor or by the owner or owners or legal representatives of the entire interest."

SEC. 5. That the last sentence in section forty-eight hundred and eighty-seven of the Revised Statutes of the United States, being in the following words: "But every patent granted for an invention which has been previously patented in a foreign country shall be so limited as to expire at the same time with the foreign patent, or, if there be more than one, at the same time with the one having the shortest term, and in no case shall it be in force more than seventeen years,"—shall be, and is hereby repealed.

SEC. 6. That no machine or other article made prior to the surrender of a patent, and the issue thereupon of a new patent, which, or the use of which, did not infringe such surrendered patent, shall be held to be an infringement of any of the claims of the reissued patent, which claims were not in the original patent at the time when such machine or other article was made. All rights of action accruing to the patentee, his executors, administrators, or assigns, for profits and damages on account of any infringement of a patent prior to its surrender for a reissue, shall remain unaffected by such surrender, and no suit shall be barred or abated by such surrender; and all suits at law or in equity may be maintained for the recovery of such damages or profits in the same manner as if said surrendered patent had not been surrendered: *Provided*, That nothing contained in this section shall apply to letters patent reissued prior to the passage of this act.

SEC. 7. That for the diffusion of mechanical knowledge and the encouragement of invention, the Commissioner of Patents is hereby authorized to furnish the weekly Official Gazette of the Patent Office, in the form and including the subjects now published therein, to subscribers within the United States, at two dollars per annum, and to subscribers in foreign countries at a price not less than the estimated cost price thereof; and the price of uncertified printed copies of specifications of patents, including the printed drawings thereof, shall be ten cents each for any number less than twenty copies, or five cents each for twenty or more copies of the same or of different patents ordered at the time; and for uncertified manuscript copies of contents of patent-files, or of any other records, the reasonable cost of making the same; and the price for certified copies shall be the same as for uncertified copies, with the addition of twenty-five cents for the certificate and seal; and all such copies of patents, or any other records in the possession of the Patent Office, when certified by the Commissioner, Assistant Commissioner or Acting Commissioner of Patents as being correct and authenticated copies of the originals in said office, shall be evidence in all cases wherein the originals could be evidence; and any person making application and paying the fees aforesaid therefor shall have certified copies thereof.

SEC. 8. That all acts and parts of acts in conflict with the provisions of this act are hereby repealed; and the five sections from section forty nine hundred and twenty-four to section forty-nine hundred and twenty-eight, both inclusive, of the Revised Statutes of the United States are hereby repealed.

Mr. George S. Moler, of Ithaca, N.Y., has patented an improvement in call instruments for telegraph lines, the object of which is to allow calling of any one station on the line, and at the same time indicate at all stations that the line is in use. The invention consists in polarized armatures and ratchet mechanism combined with the call-bell for setting the instrument and selecting the bell to be rung.

Domestic Life in Texas.

"It wasn't that!" exclaimed Mr. Sanders indignantly. "You see, I didn't say a word at all."

"How'd she find out, then?" asked one of the party.

"Why, I went home, and she asked if it was me. I told her it was. Took the chances on that, you know. Then she asked me if I'd been drinking. I told her no. And there I stopped. Never said another word."

"But you say she caught on somewhere. How was it?"

"Just a blunder I made. When I told her I hadn't drank anything, she was satisfied, but when I come to get to bed I put on my overcoat instead of my nightshirt. That excited suspicion."—*Texas Siftings.*

Instead of alloting the surplus from the Electrical Exhibition to the new School of Chemistry and Physics, M. Cochery has kept it for the establishment of a laboratory of electricity, which will be under his administration.

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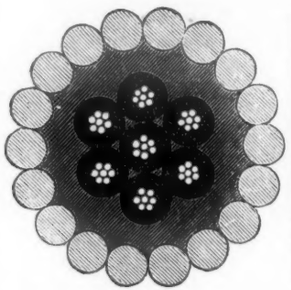

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